RAILROAD GAZETTE

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Contributions

J. T. A. and J. J. H.

New York, March 1, 1902.

TO THE EDITOR OF THE RAILROAD GAZETTE.

I have read with great interest your luminous editorial on the Northern Securities Company and the Anti-Trust Law (Feb. 28, p. 146). Your description of the situation is more lucid than any that I have seen elsewhere. I conclude, however, that your law editor is a retired judge; for he has the judicial habit of refraining from directly answering the main question at issue—until he is obliged to.

You say that it is impossible to forecast the result of the proposed suit and that therefore you can only indicate the lines on which the controversy will proceed. But most of us have a feeling that those lines will run up against something, pretty soon after they get started, and we are curious to see what you think that obstacle will be, and where it will be encountered.

You say that you will agree with the *Sun* that owning railroad stock is an innocent thing, even though ownership may involve controlling rates, provided the only purpose of the owner is to take his dividends. But in presenting this argument the *Sun* is only sophisticating. Its claim that in owning stock one only indirectly and remotely controls rates is "too thin." You bury it out of sight in your next sentence.

Why do you recognize as worthy of notice that elusive argument about the purpose of the buyer of railroad shares? You might as well talk about the "purpose" of a man not to pay taxes, when he buys a piece of land, or the purpose of a toper not to get drunk at a dinner where wine is free. We do not need to discuss this question from the theoretical point, solely. Cases are numerous where men of wealth have bought railroad stocks with the definite purpose of saying nothing whatever to the managing officers, but who have been compelled by the failure of those officers or by death or other unforeseen contingencies to take a hand in the management of the property. If you own a majority of the stock of a railroad you are bound to manage the road. You cannot absolve yourself by keeping away from the president's office. You must vote annually for or against his re-election, and thus approve or disapprove his doings. If you refrain from voting, the State ought to take your property out of your hands. Of course, no one expects that in the Northern Securities case it will come to a question of voting for or against a president. As was testified by some of the leaders at Chicago, before the Interstate Commerce Commission, no heavy shareholder, when asked by the president of a road to give "advice," is likely to refuse to give it, unless he is ignorant—and ignorance is not imaginable in this case. And the Sherman law condemns that conversation between the stockholder and the officer just as mercilessly as though it were the most elaborate written order ever made.

The main question, as put by you, is, can the corporation do that which individuals cannot do? Another way to phrase it would be, Will the law prevent the carrying out of acts which have been illegally begun? From the standpoint of the Sherman law, the men who organized the Northern Securities Company illegally conspired, when they organized; and an act of the company which restrains commerce is merely a part of the original illegal act.

It seems to me that the most instructive comparison between corporations and individuals is that which I have indicated in my title; that between the Joint Traffic Association, referred to by you, and the individuals who are now threatened with the law. The J. T. A. was a useful business enterprise, but its acts violated the Sherman law, and so the Court paralyzed it. The Court was able to do this because a corporation is an artificial person and cannot hide, or run away or in any manner evade its judicial pursuer. The court can kill it by a single stroke. It has no right to life, liberty or the pursuit of happiness except by the will of the State, and not many rights of that class, in any event.

But how different is the situation when you consider a real person. It is true that New Jersey cannot put on its books a statute overriding the Anti-trust law; but its citizens and citizens of New York and Minnesota can and do override Federal laws; and what is more to the purpose, they do this by means of acts which are so apparently reasonable that many people, perhaps a large majority of the citizens of the country, consider the men right and the statute wrong. When I speak of hiding or running away I do not mean to imply that the officers of the Northern Securities Company expect to get around Congress and the Courts by such stealth; but when the officers of the J. T. A. framed an agreement which avoided infraction of the letter of the Anti-trust law while still violating its spirit, their act was not at all different, ethically, from that of the individual who evades the law by methods less easily defined. The man who takes care not to make any contract in violation of the statute, yet maintains rates on coal, for example, in accordance with the terms of a two-minute conversation held at the lunch table with a man who controls coal rates on a rival road is not so bad, perhaps, as one who runs away at the Sheriff's approach; nor so good as those who, like the managers of the J. T. A., put all their acts on record; but morally, they are all about alike. The railroad traffic managers who agreed on a division of the cotton traffic from Memphis in 1899 (*Railroad Gazette*, page 474) succeeded in practically defying the anti-pooling law; and yet all they would own up to doing was to "announcing," each for himself, that he would accept a certain percentage of the total cotton shipped.

Of course, a court of equity, if it follows the parties long enough, and does not find itself thwarted by mere lapse of time, will punish trickish evasions of the spirit of a law, as well as well-defined disobedience of the letter; but, as before remarked, these evasions enjoy more or less public sympathy because the laws are believed to be more or less inequitable or oppressive.

Now, what can you do with the men who own the stock of two rival railroads and who wish to sell it to a "securities" company? You can forbid such sale. But can you prevent the Northern Pacific directors and those of the Great Northern from choosing the same man as sole ruler of both companies, as far as competing rates are concerned? Supposing you could thus prevent united action, what grounds of justice or public welfare could be cited in support of the act? You might order the ruler of two railroads to instruct his subordinate on one road to constantly fight the man on other (such strife is said to have existed on two roads both controlled by the Vanderbilt interest) but that would only the more clearly show the absurdity of the whole procedure.

Unless we are to overturn our whole social system we cannot prevent a capitalist from taking his money out of one pocket and putting it into another; and that is all he is doing when he forms a "securities" company. The liberty to do this is as fundamental as the liberty to draw your salary and spend it as you see fit. If you allow two Vanderbilts to act together, or two Goulds—and no one has suggested trying to prevent this—how will you draw the line when the four decide to form a quadripartite agreement? Or, where will you draw it when these four take in four or eight other respectable citizens to do only lawful acts?

If the Legislature of Minnesota or the Congress of the United States finds freight or passenger rates too high, why don't they adopt the simple rule of Georgia or Texas, and reduce them?

S. G. A.

The Baldwin Celebration.

On Thursday evening of last week (Feb. 27) Messrs. Burnham, Williams & Co. celebrated the seventieth anniversary of the Baldwin Locomotive Works, and the production of locomotive No. 20,000, with a banquet at the Union League Club in Philadelphia. The affair was very handsome and dignified and quite worthy of an occasion so important. There were about 250 guests present, including Mr. Baer, President of the Philadelphia & Reading; Mr. Cassatt, President of the Pennsylvania; Mr. Fish, President of the Illinois Central; Mr. Harriman, the controlling spirit in several railroads; Mr. Westinghouse; Captain Green, First Vice-President of the Pennsylvania; Mr. Callaway, President of the American Locomotive Company; Mr. William Sellers and Dr. Coleman Sellers, and Mr. John Fritz. But we cannot take the space to give anything like a complete list of the "captains of industry" present. Mr. Converse presided and read a letter from Mr. Burnham, the senior member of the firm, regretting his inability to be present because of indisposition. The speakers and toasts were: George F. Baer, "The Industries of Pennnsylvania"; John P. Green, "The Pennsylvania Railroad"; Stuyvesant Fish, "Autocrats and Democrats"; James M. Beck, "The Unity of the Republic"; and J. Harris Sanders, "American Development from an English Standpoint." Some extracts from their addresses as reported at the time follow:

John H. Converse, Baldwin Locomotive Works.

. . . I wish to express the regret which I feel, in common with my associates, that our senior partner is not occupying the place which I am temporarily filling. His presence would be of peculiar interest. It is no exaggeration to say that he is the Nestor of the locomotive builders of the world. He entered the employment of Mr. Baldwin in 1831, and has therefore seen the entire life of the works of which he is now, and has been for 30 years, the senior partner. . . .

We celebrate to-day the completion of 20,000 locomotives. When I remind you that statistics show that there are on all American railroads probably about 44,000 locomotives, we feel a pardonable pride in the share which we have had in contributing to the number built. One other bit of statistics and I will close, and that is that our foreign trade has amounted in these 70 years to nearly one-fourth of our product. We have exported in the 70 years 4,457 locomotives out of the 20,000 which have been built. . . .

George F. Baer, President of the Philadelphia & Reading. "The Industries of Pennsylvania."

Gentlemen, when I count my mercies, this is among them—that, I am a Pennsylvanian. I am proud of her history, proud of her population, proud of her resources and still prouder of her industrial achievements. There are other lands fair to behold, but there is no territory on this good earth comparable to this grand old State. Here nature, in the distribution of her gifts, has spread a lavish hand and everywhere we turn we find an abundance of wealth that is greater than the dreams of the Indies . . . But there was no development; they waited the coming and the development of the race of men that could make them useful. It was only in the last century that that race appeared. . . . All this wealth, all these enormous resources, were of no avail, because man had not been able to develop a system of transportation that would assemble them and make them useful. . . .

That is the secret of the progress of the last 70 years. Without these facilities for transportation, moving along steadily and progressively, the industries of the great State of Pennsylvania would never have been developed. When the future epic comes to be written it will begin something like this: "Tools I sing and the man," and in that epic this great firm that has done so much to develop the progress of the United States and the world will be entitled to be ranked as the most progressive of inventors and developers of the locomotive.

Capt. John P. Green, First Vice-President Pennsylvania Railroad, "The Pennsylvania Railroad."

. . . When the charter was granted in 1846 by the Commonwealth of Pennsylvania to the Pennsylvania Railroad Company it is clear that, either consciously or unconsciously, the people of this section of the United States had made up their minds that the Allegheny Mountains should not longer be permitted to stand as a barrier between the Atlantic seaboard and the empire of the Great West. . . . On the south the Baltimore & Ohio was stretching towards the Ohio River. On the north the State of New York, through her Erie Canal, was seeking access to the Great Lakes and also a share in the great commerce of the country west of the Blue Ridge, a commerce not great then, but which every one saw must develop and must become of immense importance to the States of the Atlantic seaboard. We all knew of the Ohio River, but it was hard to reach. We knew of the thousands of miles of fertile valleys that it watered. . . . And in 1846 it was determined that there should be a through line of railroad from the City of Philadelphia to Pittsburgh. . . .

The Philadelphia merchant has done a great many good things in the past, both for himself and for his city, but he certainly never did a more sagacious thing than when he left his counting house and raked the city of Philadelphia as with a fine-toothed comb to get subscribers to the stock of the Pennsylvania Railroad Company. . . . Of the first 2,600 subscriptions that were made 1,800 were for five shares or under, showing how universally the city had been visited and how people had responded in every walk and branch of life.

The city having come forward with a superb subscription of one million dollars, and you will remember one million dollars in 1846 was a much larger sum than it is now, the Pennsylvania Railroad Company was bound, under the terms of its charter, to have three millions of dollars subscribed, to have a million dollars paid in, to have fifteen miles under contract at each end by July, 1847, or else the Baltimore & Ohio road had been given a franchise to build from Cumberland to Pittsburgh, and she would gain an advantage over the Pennsylvania Railroad in reaching that city, and Baltimore was in a fair position to wrest from Philadelphia her commercial supremacy. . . .

The State of Pennsylvania had her own system of public works. She was in the business of transportation, and she did not welcome the company that was entering on her domain and was contending with her for the commerce of the West. So much was that the case that she insisted

on levying a tax of 5 mills a ton a mile on every ton that was transported over the Pennsylvania Railroad more than 20 miles. The Pennsylvania Railroad Company was not relieved from that tax until 1861, which was four years after the State had at last been persuaded that she knew nothing of the effective or economical management of railroads, and had sold her main line to the Pennsylvania Railroad Company. But from that day on the work of building the road and getting across the mountains to reach Pittsburgh was steadily pushed forward, until, in 1852, using the State's portage road over the Allegheny Mountains, there was at last a through railroad from Philadelphia to the Ohio River at Pittsburgh.

Although it was not until 1854 that the Pennsylvania Railroad's own tunnel was completed across the mountains, yet practically in 1852 the through line was opened. The State had accepted the situation. So completely had the wisdom of the promoters of the Pennsylvania Railroad been demonstrated that it was in 1852 or 1853, only a year after the completion of the road through, that it became necessary to double track the line in order to take care of the business that was being thrust upon it.

Then came a very hot and very excited discussion. The Pennsylvania Railroad had been built upon the theory that it should have no debt, but it had found it very hard work to get money from its subscribers to the stock, and the brilliant idea came to the people who supported that road that if they would say to the stockholders, "If you subscribe to the stock, we will agree to pay you interest at 6 per cent. from the time you make the subscription, just exactly the same as if you were a creditor," that would enable a great many people who could not give money to subscribe to it. That promise was made, and was faithfully carried out, and until the road began to earn regular dividends the subscribers to that stock got 6 per cent. upon their money.

That leads me to what I may fairly say I think have been the three principles that have dominated the policy of the Pennsylvania Railroad since its original construction.

First, that wherever practicable the money to develop and improve that line shall be got from the shareholders, and that they shall reap the benefit and profit of it, instead of getting it from creditors. It, of course, had this advantage, which the men of that age were quite sagacious to see, that when a time of trouble came it was a great deal better to deal with your partner than with a creditor. While the emergencies that have put the railroads of this country in peril have not been very frequent, yet we all know that there have been times, notably the riots of 1877 and one or two other occasions, when the credit of our railroads has been strained to the utmost and when it has been of prime importance to a railroad that it should be held by its stockholders and not owned by those who held its bonds and obligations. At any rate, that has been its policy, and I do not believe that the people who have invested in the road have ever had occasion to regret that policy, because . . . the stockholders of the Pennsylvania Railroad Company have received on an average 8 per cent. in dividends from the time the road was opened until the present day.

The second underlying principle was that the Pennsylvania Railroad Company, from the moment of its construction perhaps in its first year and certainly in its second year, laid down clearly the policy of helping the construction of connecting lines. You will find that while the road was struggling for the money to build its own line, it was with a wise policy helping to build the Ohio and Pennsylvania road, which afterward became the Pittsburgh, Fort Wayne & Chicago, which is now part of the Pennsylvania Railroad System. You will find it helped the Marietta & Cincinnati. You will find that there was no road that was started in the West whose geographical location made it a proper and natural feeder for the Commonwealth of Pennsylvania, for the City of Philadelphia, and necessarily for the Pennsylvania Railroad Company, but that the Pennsylvania Railroad Company was ready to strain its credit to help those new roads in the hard conditions, and finally, after they were helped through and put on their feet and made into good properties, they all eventually became part of the system of the Pennsylvania Railroad Company. You all know how the Northwestern system and how the Southwestern system of the Pennsylvania road have been built up. It started, as I say, in Mr. Thomson's time, away back in 1847, 1848 and 1849. You will find that Mr. Thomson was sagacious and farseeing enough to see that that meant the future prosperity and development of the Pennsylvania Railroad Company.

The third underlying feature of our policy is that the Pennsylvania Railroad Company has always felt that it owes to the State that give it birth and to the city that fostered it true fealty and allegiance.

Mr. Stuyvesant Fish, President Illinois Central, "Aristocrats and Democrats."

The 12 months from September, 1831, to September, 1832, which saw the beginning of the Baldwin Locomotive Works, were big with other events, to some of which I venture to call your attention.

It was within that period that the *American Railroad Journal*, the earliest of our technical papers, made its appearance; that the Albany & Schenectady Railroad, the beginning of the New York Central system, was opened; that the State of New Jersey gave to the Camden & Amboy Railroad, now operated by the Pennsylvania Railroad Company, the exclusive monopoly of all transportation by rail between New York and Philadelphia, for all time; that the Baltimore & Ohio Railroad Company, after painstaking inquiry, finally determined that its traffic could be moved by locomotives; and that the first corporation chartered by the concurrent action of two States to carry on interstate commerce, the West Feliciana Railroad Company, began to build its railroad in Louisiana and Mississippi. My being at this time responsible for the conduct over that railroad of "commerce among the States" may account for my being called on to-night.

In spite of all its traditions about State's rights, and a strict interpretation of the Constitution, Mississippi was the first to pass an act "to extend and incorporate" a railroad company of another State within its own borders. . . . The West Feliciana was the first railroad authorized by the State of Mississippi, and, if I mistake not, it was also the first essentially interstate railroad ever chartered, or built.

Of great importance . . . was the action taken by the Baltimore & Ohio Railroad Company as set forth in their sixth annual report, dated Oct. 1, 1832:

"Among the events of the last year, connected with the progress of the work, to which the board adverts with the greatest pleasure, is the result of the experiments in the use of the locomotive engine. It will, no doubt, be recollected that the unavoidable curves and ascents of the road, induced many to believe that the use of steam, to any extent, was impracticable; and that horse power must be applied at all events, upon much the greater portion of the road. A small engine, however, constructed by Peter Cooper, Esq., of New York, made several trips up the ascents and through the curves, between Baltimore and Ellicott's Mills; and an engine for the conveyance of passengers, built by Davis & Gartner, of York, Pa., has recently been employed, with but little intermission, for upwards of a month, doing the entire transportation of passengers between Baltimore and the foot of the inclined planes, a distance of 40 miles, traveling, therefore, with a train of cars, a distance of 80 miles every day."

That the Delaware & Hudson Canal Company had, at an earlier day, imported engines, is shown by the following extract from the diary of its president, Mr. Philip Hone:

"Wednesday, May 27, 1829. I went to Abeel & Dunscomb's foundry to meet a large party of gentlemen, who had assembled by invitation to see one of the new locomotive engines in operation, which was recently imported from England for the use of the Delaware & Hudson Canal Company, and which had been temporarily fitted up under the direction of Abeel & Dunscomb. . . . The second locomotive steam engine which was imported for the Delaware & Hudson Canal Company was set in operation this afternoon at the works of the Messrs. Kemble, in the presence of a large party of gentlemen, and succeeded as well as the one I saw yesterday at Abeel & Dunscomb's."

. . . That my statement as to the Camden & Amboy Railroad be not misunderstood, let me quote from the Act passed by the State of New Jersey March 2, 1832, supplementary to the charter of that company, which provides:

"That it shall not be lawful, at any time during the said railroad charter, to construct any other railroad, or railroads, in this State, without the consent of the said companies, which shall be intended or used for the transportation of passengers or merchandise between the cities of New York and Philadelphia, or to *compete in business* with the railroad authorized by the act to which this supplement is relative."

That the value of the franchise thus given by the State as an inducement to the further dedication of private funds to a public work, was at that time appreciated by men of affairs, is shown by Mr. Hone having, in 1832, written of the Camden & Amboy Railroad: "This is expected to be the best joint stock property in the United States." Events have justified his opinion.

The charter was perpetual. As a result we have the New Jersey Division of the Pennsylvania Railroad, affording probably the best, quickest and most frequent service in this country, and we see New Jersey blessed with more miles of railroad in proportion to its area, and on the whole better railroads, than any other State in the Union. . . . The later and present policy of that well-governed and law-abiding State in respect to corporations has resulted in practically freeing the citizens of New Jersey from all direct State taxes and forcing her bigger and richer neighbor, New York, to adopt a like policy. Since the beginning of the struggle which led to the independence of these United States, there have passed from active life four generations of men. Each has witnessed a contest between those who had not and those who had what was, in their day, the largest visible share of the wealth of the country.

In the first generation the fight was against the landed proprietors, who had succeeded in putting into the Constitution of all, or nearly all of the 13 States, property qualifications. This ended, in the early years of the nineteenth century, in the triumph of the advocates of a pure democracy based on manhood suffrage.

In the next generation the banks appeared to have the most of the wealth, and the attack on them culminated in the removal, by President Jackson, of the deposits made by the Federal Government.

Slavery then became the absorbing topic. Stripped of all questions of sentiment and morals, the struggle was between those who had not and those who had slaves. This, with the Civil War and reconstruction thereafter, occupied public attention until 1870.

Our own generation has since seen a persistent attack, in the legislatures, in the courts, and through commissions, State and Federal, upon the railroads, which in turn had come to appear to own the largest visible aggregation of property.

We are now at the beginning of a struggle against what are popularly known as "Trusts," but which might better be named consolidations or amalgamations. The real thing inviting attack is, however, as before, the largest visible aggregation of wealth.

What has been the outcome in each case? Were the landowners deprived of their property? No; but they were deprived of political rights based on property. Were the banks deprived of their charters or their capital? No; but the Federal patronage was withdrawn from them. Were our brethren in the Southern States deprived of their property in slaves? Yes; but not until after they had committed overt acts of war. Have the railroads been deprived of their property? No; but of a large part of their franchises, yes.

Candor compels me to say that this last was, in a measure, due to so many of the railroads having, of their own accord, mixed in politics, and so brought the evil on themselves through a course only less unwise than that of the slave-holding South. Others may not agree with me in this, but none will to-day advocate the wisdom of a railroad corporation meddling in politics. . . .

What will be the outcome of the contest now opening against the so-called Trusts, is beyond human wit to foretell, but that those entrusted with the management of such vast masses of capital should learn wisdom by the experience of the past, goes without saying.

It may also be pertinent to recall that, vast as are the sums now in view, they do not represent anything like so large a share of the wealth of the country as did, in their day, either one of the four aggregations of capital about which I have spoken.

At the close of the Revolutionary War, land represented practically all the wealth there was in the country, and it was in many States held by a few individuals and families, and, after the English custom, strictly entailed. More than 100 years ago there was in existence at least one bank with $10,000,000 of capital, the stock of which had been largely over-subscribed within an hour. There is to-day in the United States no bank with a larger capital.

The $200,000,000 which, at the breaking out of the Civil War, fairly represented the value of the slaves, as property, undoubtedly formed a larger proportion of the total wealth than does any combination of capital which has yet been effected. Nor can there be any comaprison between the capital of any one industrial trust and that of all the railroads.

But our friends who are interested, as I am not, in the amalgamations and consolidations now going on, labor under other disadvantages:

First. There is in some of them an apparent overcapitalization. So far as this exists, it will cure itself, or kill the patient, through the familiar process of reorganization, which so thoroughly squeezed the "water" out of railroad securities in 1873, and again in 1893.

Second. That their schemes have come before the public so suddenly.

Third. That this has been done on so vast a scale.

On the other hand, they have this advantage, that their securities are at the outset chiefly held by thousands of our own people in comparatively small lots, instead of being held, as the railroad securities originally were, in large lots, and to a great extent by foreigners.

Fortunately for the railroad companies, the same thing may now be said of them. I know not precisely how it is with others, but believe their experience must tally with ours on the Illinois Central. When I entered the service of the company it had for years been paying cash dividends of 10 per cent. per annum, and we had in America only 338 stockholders, who owned but $3,451,500 of the then capital of $25,479,400, or less than one-seventh, and in Illinois we had only three—the President, the Treasurer, and a gentleman who had recently been a director of the company—they together owned 157 shares, or $15,700. One concern in Holland then held nearly 30 per cent. of the entire capital, and more than half of the whole was owned in Great Britain.

At present 5,180 individuals living in this country own $57,723,600 of the stock, being nearly three-quarters (73.16 per cent.) of the whole capital of $79,200,000. Including some hundreds of our employees, we have 989 stockholders in Illinois who together own $7,857,500, which is nearly double the amount now owned in Holland. Fully one-half of the shares are owned in lots of $50,000 and less, and the average of all holdings is $10,385. There are, at home and abroad, 5,684 proprietors who own less than $10,000 apiece. Obviously our company is not controlled by aliens or plutocrats. This is doubtless equally true of others.

With these facts before us, we men of modest means and those of less, can view with equanimity the formation of companies yet larger than any which have been thought of. We must not forget that whatever adds in any way to the wealth of individuals adds equally to that of the country, nor can it be questioned that the poorest paid laborer is to-day better clothed, better housed, better fed, and has better educational advantages and surroundings, than had the average citizen a century ago. . . .

Those "twin monopolies" of our generation, the railroad and the telegraph, have done something for the plain people, and those who have forever dedicated their capital

to the service of the public in these hazardous ventures are at length reaping a reward in the shape of dividends. I have faith to believe that the so-called Trusts will also weather their storms and eventually fare as well. With all due deference to the wisdom of those captains of industry who organize and manage the so-called trusts, and in full appreciation of the danger of volunteering advice, I will close by submitting to them, and *to others*, the patent fact, that every legislator, State and Federal, has among his constituents two large classes of men who are directly interested in the continued prosperity of corporations, the employees, who naturally desire the maintenance of the present high scale of wages, and the stockholders, who appreciate and demand dividends. Each of these classes is growing in numbers, and every member of each has and exercises the electoral franchise.

[NOTE.—For the extracts from Mr. Philip Hone's diary I am indebted to my friend, Mr. John Hone, who very kindly had them copied from the original manuscript.]

The address of Mr. Sanders is received too late for publication this week. We shall print it in our next issue.

Cinders and Sparks.*

II.

The activity which characterizes the process that goes on in the fire-box of locomotives has already been described (page 140). That required rates of combustion may be maintained, the air-currents passing through the fire need to be very strong. Air enters through the grate, mingles for an instant with the combustible properties of the fuel, the fuel burns, and the products of combustion are as quickly drawn away from the fire-box, through the tubes to the front end, and thence forced up the stack and into the atmosphere. The whole passage from the grate, through the fire-box, and into the tubes is as in the twinkle of an eye.

The layer of incandescent fuel often dances on the inrushing currents of air and if by chance some portions become thinner than others, individual coals of considerable size are tossed far above the general level of the fire, settling back and awaiting for an instant a new impulse to send them up again, responding to the action of the exhaust, just as apples keep in air in response to the toss of a boy's hand. If the spot continues to become thinner, the strength of the draft will after a time overcome the weight of the fuel, which floats away bodily, leaving a "hole" in the fire with the bare grate at the bottom.

In the midst of such conditions as these, sparks are born. Light particles of coal, unless well cemented together by water when thrown into the furnace, never reach the grate but ignite in the flame of the furnace and partially consumed are borne into the tubes. When a friable coal is used, the lumps on the grate, breaking up under the action of heat, give rise to many small fragments which prove too light to keep their place with the more solid masses of the fire. These also fly into the tubes. Much of the ash which results from the combustion of fuel on the grate, and which in a stationary boiler would drop through to the ashpan is, in a locomotive boiler, caught up by the draft and carried into the tubes along with the incandescent coke to which reference has already been made. It is in this manner that the procession of cinders is formed. Every particle which enters the tubes at the fire-box end is ordinarily carried through into the smoke-box. Here some are entrapped. In the smoke-box they gradually cool, the exclusion of outside air preventing the combustible portion from burning. At the end of the run they are removed. The remainder, after being baffled and knocked about by obstacles set in their path, and greatly lowered in temperature by contact with escaping steam, are thrown out from the top of the stack.

It will be seen that the solid material entering the tubes from the fire-box has either the form of living coal or that of ash. By the time it reaches the front-end the coal has become coke. The mixture of finely divided coke and ash which finds its way into the smoke-box is indiscriminately referred to as sparks, cinders, smoke-box cinders, and "front-end cinders," these terms applying to the material while it is within the front-end and, also, after it is removed therefrom and put to various uses. Without attempting to discuss the reasons underlying the use of these various terms, that of *front-end cinders* will be employed for the purpose of the present text.

Of all the solid particles which pass through the tubes and which by convention are to be called front-end cinders, a portion passes out of the top of the stack. Such particles are commonly spoken of as "sparks" or "cinders." For the present purpose they will be called *sparks*. It should be noted that this term is adopted merely as a definition; it is not strictly descriptive. The cinders which escape from the front-end and become sparks retain all the characteristics of front-end cinders. Some are composed entirely of ash. Others are of coke which, in their passage of the front-end, have been hammered against plates and immersed in steam until they are entirely deprived of fire, and are as incapable of doing damage by fire as the ash itself. All such sparks are commonly referred to as "dead sparks." Still others, constituting a very small proportion of the whole, escape at a temperature sufficiently high to glow in the dark, and of these it sometimes happens, where very light fuel is used, that a few flame; but flaming sparks are of rare occurrence.

. . . It will be evident that conditions favorable to the production of cinders and sparks are, under normal conditions of working, always present; that this fact is not the outcome of improper design or of any failure to appreciate the disadvantages they involve on the part of those responsible for the proper operation of locomotives; but that they exist as a necessary consequence of the exactions of service and in spite of the efforts of skilful men who have lived and worked since the day of Stephenson to overcome them. . . .

An exhibit of typical cinders and sparks is presented as Figs. 5 and 6. In each case the pile *A* is made up of sparks emitted from the top of the stack, and collected in the manner already described,* while the pile *B* is composed of cinders taken from the front-end after a run. For purposes of comparison, a pile of buckshot C is added, the diameter of the individual shot being $^5/_{16}$ in. The sparks and cinders making up Fig. 5 represent conditions of heavy running. They were obtained during a test for which the draft was represented by 7 in. of water and the rate of combustion was 221 lbs. of coal per foot of grate per hour. Fig. 6 represents conditions of light running, the materials shown having been obtained during a test for which the draft was represented by 3 in. of water and the rate of combustion was 84 lbs. of coal per ft. of grate per hour. The coal was Brazil block and the tests were made on the experimental plant of Purdue University. The materials shown in both figures may be accepted as representative of all that accumulated during tests of several hours' duration, and as extreme conditions are represented, it is but fair to presume that the largest sparks which are likely to be given off from the stack by an engine in good condition are those shown by *A*, Fig. 5, and that under lighter conditions of running they will not be larger than those shown by *A*, Fig. 6.

*[See proceedings of the New York Railroad Club, Sept. 1896.—Editor.]

FUEL VALUE OF CINDERS AND SPARKS.

The total cinder and spark loss for any given period is found by ascertaining the weight of the solid material which accumulates in the front-end and the weight which is discharged from the top of the stack. Weighings of the front-end cinders are readily made at the end of a run and the weight of sparks passing out of the stack may be determined by the method already described.*

Results of an investigation this made are presented in Table I.

It is to be noted from the data given in Table I that the draft conditions for the tests under consideration, range from 2 to 5 in. of water, and that the coal burned per hour varies from 790 to 2,100 lbs., which is equivalent to a rate per hour of from 45 to 121 lbs. per foot of grate.

The weight of sparks passing up the stack, and the cinders collecting in the front-end per hour, respectively, are given in Columns VII and VIII, while the total weight appears in Column IX. Column X gives the ratio of total weight of sparks and cinders to the total weight of coal. It shows that the weight of cinders and sparks varies from a little more than 4 per cent. to nearly 14 per cent. of the weight of coal fired, the weight being greatest when the rate of combustion is highest.

[These results were obtained from a locomotive having a narrow fire-box and a grate area of 17.5 sq. ft. In using them as a measure by which to estimate similar losses from other locomotives, it is probable that comparisons should involve like rates of combustion.—ED.]

*See proceedings of the New York Railroad Club, Sept. 1896.

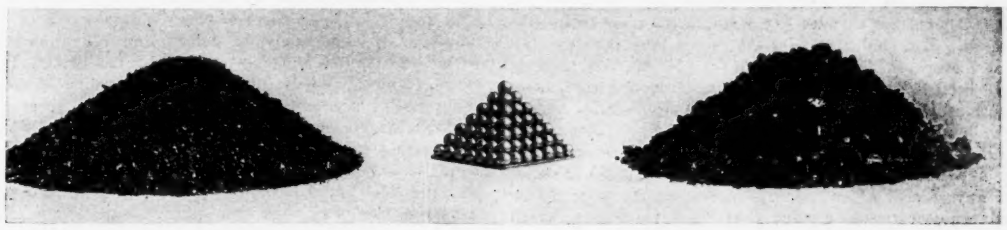
TABLE I.—WEIGHT OF CINDERS AND SPARKS FROM PURDUE LOCOMOTIVE, SCHENECTADY NO. 1, BRAZIL BLOCK COAL.

Number of test.	Speed in miles per hour.	Position of reverse lever. Notches forward of center.	Draft in inches of water.	Total lbs. of coal fired per hour.	Lbs. of coal fired per sq. ft. of grate surface per hr.	Lbs. of sparks passg out of stack per hour.	Lbs. of cin. caught in front end per hour.	Total lbs. cin. and sparks p'r hour.	Ratio of total wt. of cin. and sparks to weight of coal fired.
I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.
1	15	1	1.93	791.5	45.23	21.90	12.30	34.2	.043
2	35	1	2.98	1,464.8	83.70	41.20	63.20	104.4	.071
3	35	1	3.02	1,513.6	86.50	46.10	49.90	96.0	.063
4	35	1	3.00	1,557.1	88.98	45.00	63.40	108.4	.070
5	55	1	3.57	1,884.4	107.68	127.5	157.2	284.7	.151
6	35	3	4.88	2,017.7	115.29	110.0	67.30	177.3	.088
7	15	9	4.99	2,121.0	121.20	215.5	78.00	293.5	.138

TABLE II.*—WEIGHT OF CINDERS AND SPARKS FROM THE PURDUE LOCOMOTIVE, SCHENECTADY NO. 2, FIVE DIFFERENT GRADES OF COAL.

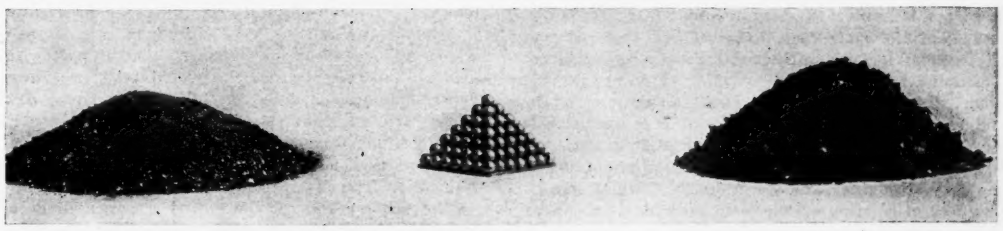
Number.	Designation of samp. of coal.	Speed in miles per hour.	Position of reverse lever. Notches for-w'd of cent'r.	Draft in inches of water.	Total lbs. of coal fired per hour.	Lbs. of coal fired per sq. ft. of grate surface per hour.	Lbs. of water evap. per sq. ft. of heating surface per hour.	Lbs. of sparks passing out of stack per hour.	Lbs. of cinders caught in front end per hour.	Total lbs. of cinders and sparks per hour.	Ratio of total weight of cinders and sparks to wt. of coal fired.
I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.
1	E.	15	5	1.51	685	40.30	4.53	14.90	20.97	35.87	.052
2	E.	50	22	5.13	2,025	119.1	10.02	294.5	174.0	468.5	.231
3	E.	30	8	5.73	2,161	127.1	10.54	311.4	145.8	457.2	211
4	D.	15	5	1.70	905	53.30	4.72	13.50	31.86	45.36	.050
5	D.	50	22	5.40	2,402	141.3	9.82	289.9	124.4	414.3	.172
6	D.	30	8	6.98	2.880	169.4	11.11	448.2	128.5	576.7	.200
7	C.	15	5	1.77	983	57.80	4.91	12.50	16.98	29.48	.030
8	C.	50	22	5.34	2,403	141.3	9.95	198.7	127.8	326.5	.136
9	C.	30	8	5.74	2,606	153.3	10.24	253.4	124.6	378.0	.145
10	A.	15	5	1.70	782	46.00	4.78	16.20	28.40	44.60	.057
11	A.	50	22	5.67	2,045	120.3	9.87	208.6	120.0	328.6	.161
12	A.	30	8	6.32	2,364	139.1	10.34	208.9	149.6	358.5	.151
13	B.	15	5	1.89	831	48.90	4.76	10.60	24.95	35.55	.040
14	B.	50	22	5.67	2,235	132.0	9.90	236.1	126.4	362.5	.162
15	B.	30	8	6.40	2,491	146.5	10.70	313.8	133.4	447.2	.180

*Compiled from a paper on "Tests of Coal for Locomotives," by William Garstang, Supt. of Motive Power, C., C., C. & St. L. R. R. Proceedings of Western Railway Club, Dec. 25, 1898.



A. C. B.

Fig. 5.



A. C. B.

Fig. 6.

. . . Values of the spark losses for each of the several samples of coal tested are presented in Table II.

The results show that when the boiler was worked under conditions which gave an evaporation of about 5 lbs. of water per square foot of heating surface per hour, 5.2 per cent. of sample E was lost in the form of sparks and cinders; also, that 5 per cent. of sample D was lost from the same cause, and so on. When the rate of evaporation was about 10, the losses by sparks amounted to

*Abstracted from advance sheets of a book now in press entitled "Locomotive Sparks," by W. F. M. Goss. To be issued by John Wiley & Sons, 43 East Nineteenth street, New York.

22.1 per cent. and 18.6 per cent. of samples E and D, respectively. It is significant that, with one exception, those samples giving the highest evaporation also gave the largest spark losses. Two conditions probably account for this fact. First, the purer coals are lighter and, hence, respond to the draft action more easily than coals intermixed with non-combustible matter; secondly, in general, the lighter the ash, the larger the percentage of ash which, instead of falling through the grate, passes out with the sparks and adds its mass to their weight.

An analysis of sample sparks obtained under different rates of combustion from Brazil block coal, shows that when the rate of combustion is low, the sparks are composed largely of ash. As the rate of combustion is increased, the percentage of ash diminishes. . . .

The relationship between the rate of combustion and the fuel-value of sparks is shown by Fig. 8. . . . By use of this diagram an estimate of the value of the spark and cinder losses for the seven tests previously under consideration may be had. Such an estimate in terms of equivalent weight of coal is shown in Table IV.

TABLE IV.—HEATING VALUE OF SPARKS FROM PURDUE LOCOMOTIVE, SCHENECTADY NO. 1. BRAZIL BLOCK COAL.

No. of test.	Speed in miles per hour.	Position of reverse lever. Notches for w'd of cent'r.	Draft in inches of water.	Total lbs. of coal fired per hour.	Lbs. of coal fired per sq. ft. of grate surface per hour.	Total lbs. of sparks per hour.	Lbs. of coal equivalent in heating value to 1 lb. of sparks.	Lbs. of coal equivalent in heating value to sparks for test per hour.	Per cent. of fuel acc'nted for as sparks.
I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.
1	15	1	1.93	791.5	45.23	34.20	.665	22.7	2.9
2	35	1	2.98	1,464.8	83.70	104.4	.801	83.6	5.7
3	35	1	3.02	1,513.6	86.50	96.00	.807	77.5	5.1
4	35	1	3.00	1,557.1	88.98	108.4	.812	88.0	5.7
5	55	1	3.57	1,884.4	107.68	284.7	.841	239.4	12.7
6	35	3	4.88	2,017.7	115.29	177.3	.851	150.9	7.5
7	15	9	4.99	2,121.0	121.20	293.5	.856	251.2	11.9

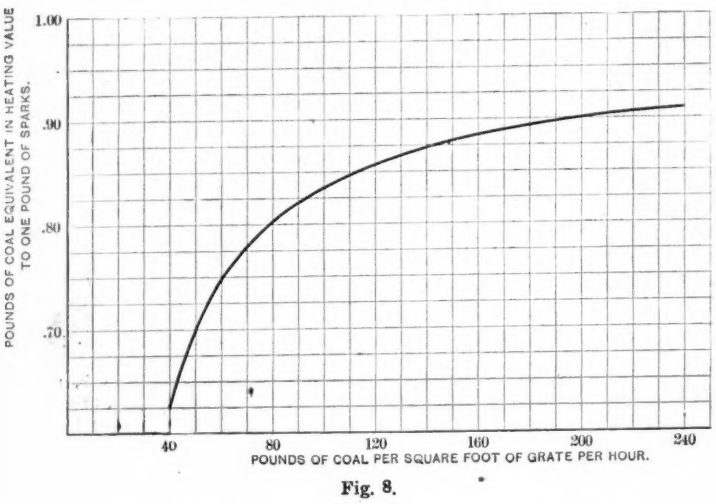


Fig. 8.

Marconi's Wireless Telegraph.

The annual general meeting of the shareholders in Marconi's Wireless Telegraph Company, Limited, was held on the 20th inst., at the offices of the company, London, Colonel Sir Charles Euan-Smith, K.C.B., C.S.I., presiding. The chairman said that since they last met the chief event in the development of the Marconi system had been the transmission of signals from the company's station at Poldhu, in Cornwall, to Newfoundland. Among the many special criticisms that had been formulated against the company's system, the principal one dealt chiefly with the low speed of working, and the absence of any secrecy of communication; but these were naturally subject to the remark that the same genius which had overcome the initial difficulty of wireless telegraphy by sending signals across an intervening space of 2,000 miles might with some confidence be relied on to remove the two defects alluded to. So far as long-distance transmission was concerned, they feared rivalry from none, though, at the same time, they believed that there was ample room for profitable working both for cable companies and for the Marconi system. Wireless telegraphy would, the board considered, result in opening up new sources of revenue for the various cable companies. Mr. Marconi was on the point of returning to Canada to make further progress with the installation of his system in that country, the Government of which had concluded a satisfactory arrangement with this company.

Mr. Marconi then addressed the meeting, and said that among the notices which had recently appeared in the press with regard to the progress of his system of wireless telegraphy, and in particular with regard to his latest tests over long distances, so much of a contradictory or distorted nature had been printed, that he had thought a concise and authoritative statement on the subject from himself might form a fitting part of the ordinary business of this meeting. Referring first to his recent experiments in the transmission of wireless signals between England and Newfoundland, he said that it was a great pleasure to him to be able to inform the shareholders that they were successful. In view, however, of the action which the Anglo-American Telegraph Company saw fit to take at the time, and of the abundance of sites available elsewhere than in Newfoundland, it was thought undesirable to continue experiments which, especially if the company had attempted to carry out commercial work before the expiry of the Anglo-American monopoly in Newfoundland, seemed not unlikely to land them in litigation; but arrangements had since been concluded under which the experiments would be continued, without loss of time, with stations both in Canada, where the company had met with the most generous encouragement on the part of the Government, and in the United States.

To set at rest what he could not help calling a somewhat ill-informed doubt which, he was told, had been expressed in some quarters, he might mention that his next series of tests would include the transmission not only of single letter signals, but of words also and messages. The letter "s" being the easiest signal in the Morse code to transmit had been used by him in connection with his initial tests, not only in this instance of signalling across the ocean, but always when he had been desirous of carrying out a first experiment over distances much greater than he had previously attempted. More than a year ago, when he succeeded in transmitting signals over a distance of 200 miles—a distance which had since been brought well within the ordinary operation of his system—the letter "s" was also employed as a signal in the preliminary tests.

As for the suggestion that he was, perhaps, capable of mistaking atmospheric "strays" for the signals which he had prearranged should be sent to him at fixed intervals and in definite succession, he should consider himself very unfit to occupy his present position if his experience in the matter did not enable him to characterize it as ridiculous.

It had been asked why, since they were able to transmit signals over such a considerable distance as 2,000 miles, the company had no regular work in hand over such comparatively short distances as that between England and Ireland. The reply to this question was that his system was, in fact, available over such distances across sea as those named, and that the sole and simple reason why it was not in commercial use between England and Ireland, or parts of these countries, was to be found in the monopoly of telegraphic communication within the United Kingdom claimed by the British Post Office. This monopoly, however, not extending to telegraphy with places outside the three-mile limit, there was nothing to prevent the company's undertaking commercial work with ships at sea, or, as they believed they would shortly be in a position to undertake it, with Canada and the United States. Up to the present, however, whenever they had been suspected of an attempt to do any commercial work within the three-mile limit, they had not failed to receive a communication from the Post Office authorities warning them, under pains and penalties, against an infringement of the monopoly claimed by the Postmaster-General.

As summarizing the alleged objections to his system on which was founded the statement that it was without genuine commercial basis, he would take two so-called expert opinions, cited by Sir John Wolfe Barry a week or two ago in his address to the shareholders of the Eastern Telegraph Company, and quoted also by Mr. Francis Bevan at the meeting of the Anglo-American Telegraph Company. The first of these passages was from the pen of Sir William Preece; the second represented the opinion of Professor Oliver Lodge. Sir William Preece was, he believed, a gentleman with various claims to scientific distinction, but, whatever his attainments in other walks of science, the most careful examination revealed absolutely no testimonial to his competency for this most recent of his undertakings. Of the conditions under which the system was now worked Sir William Preece was, in fact, wholly ignorant. He regretted to say that, distinguished as Dr. Lodge might be as a professor of physics or as a student of psychical phenomena, the same statement applied also in his case in respect of the company's present system of wireless telegraphy.

The main items of the indictment of his system, particularly as a commercial system for use over long distances, were its alleged lack of secrecy, of speed, and of general reliability. Bare facts were the best answer to allegations of this sort, so he would simply mention that his system was at the present moment in permanent use in over 70 ships and at 25 land stations in regular everyday work. As to the general trustworthiness of the system, even on its earlier, initial working, three years ago, the Deputy Master of Trinity House, reporting on its operation at the East Goodwin lightship, publicly stated before the Institute of Electrical Engineers that he had never known it once to fail, though, if failure there had been, it must have come to his knowledge.

With regard to speed, he had seen it stated to be six words a minute, whereas, in the same space of time, by cable across the Atlantic, about 40 words could be transmitted in the most favorable case, a more ordinary speed being less than half that number. In point of fact, with his latest apparatus he was able to transmit 22 words a minute, and in the early days of the cable system the transmission of even one word a minute over a cable was only accomplished with great difficulty. One most important fact to be borne in mind was that, whereas the speed of the submarine cable was directly affected by length, the speed of working of the wireless system was not affected in the least by distance. It was just as easy to work at a high speed across the Atlantic or across the Pacific as to work across the English Channel.

Then there was the objection which, were it well based, would be the most serious that had been brought against his system—namely, that under it the secrecy of messages was impossible. He was happy to state that to the latest phases of his system that objection had become to all practical intents and purposes entirely inapplicable, the difficulty in question having been found to be satisfactorily overcome by the adoption of syntonic devices. These were not employed as yet by the British Admiralty; but he was now able to transmit messages between England and Ireland—over a distance of 200 miles—as he was confident of being able to do with equal, if not even greater facility across the ocean—without interfering with or, under ordinary conditions, being interfered with by any ship working its own wireless installation between his stations or elsewhere. As an illustration of the point to which tuning had been already developed, he mentioned that the Lizard station was at present able to work with ships without suffering any interference at all from the contemporary working of the big-power station at Poldhu, only seven miles away. The latter, apart from tuning, would entirely prevent any such independent working of the Lizard station. He would not say that under no possible combination of circumstances could such a wireless tuned message be tapped or interfered with, but he would remind them that such a statement would be no less true of cables and telephones than in the case of his wireless system. Cables were apt to be cut, and were subject to numberless risks of interruption. Mr. Marconi then referred to his visit to Canada, and said that he expected to be back in England about the end of March, and that if after his return Sir William Preece or Professor Lodge, being of opinion that within a space of, say, a week after due notice given to him they could succeed in intercepting and reading messages to be probably transmitted by him at stated times within that period between two of his stations, he would be happy to place any of his adjacent stations at their disposal for the purpose. If they would prefer to conduct their operations from a ship, they would be quite welcome, so far as he was concerned, to do so.—*The Economist.*

Delivering Orders Without Stopping the Train.

The Delaware, Lackawanna & Western has issued rules under which the "19" form of train order will be used on double track, for conferring train rights (the "31" form of train order will invariably be used to restrict train rights), and without stopping the train. When the "19" train order is ready for delivery, the operator will go on the ground, with two hoops provided for the purpose, with the copy of the order and a clearance card attached to each, and, if the train order signal has been properly acknowledged by the engineman, he will deliver one each to the engineman and conductor.

The engineman and conductor will catch the order hoop on their arm by passing the hand through it; they must not attempt to grasp the hoop by hand.

After receiving the order the engineman must not pull his train past the telegraph office until given a "proceed" signal by the conductor. If the engineman fails to catch the order or to receive "proceed" signal from the conductor, or if the order is illegible or not addressed to the train receiving it, he must stop the train and obtain orders or a clearance card.

Operators having "19" train orders for delivery will place them in the clasp of the hoop, to deliver as explained above.

Order hoops received by enginemen and conductors will be delivered to the offices designated by the superintendent. Night operators will report to the train despatcher each night, between 9 and 10 o'clock, the number of order hoops on hand. Not less than five nor more than 10 order hoops should be supplied to or kept on hand at any telegraph office. The chief train despatcher will direct distribution accordingly.

Enginemen must not place order hoops on the boiler head or steam pipes, as it will cause them to dry out and become brittle.

Operators delivering a "19" train order by hoop at night will use a white lamp and hold it so that the light will

shine on the circle of the hoop, in order that enginemen and conductors may see the hoop plainly.

At night the conductor will display his white lamp while approaching a telegraph station where the train order signal is displayed, to enable the operator to locate him.

The Use Got Out of Freight Cars.

Mr. J. W. Midgley, of Chicago, the former well-known traffic commissioner, is now engaged in studying the car service problem, having been commissioned by 25 railroads to examine available statistics and see if he can throw light on the question of what can be done to effect the abolition of the wasteful practices which are now common. He has issued to the railroads which employ him a lot of letters, giving the results of his studies. Most of these letters have been designated "private," but he has now made public one which, presumably, is intended to summarize the facts which have been gathered.

In this letter it is stated that a study of the statistics of the railroads operating 69 per cent. of the mileage of the country, and owning 81 per cent. of the freight cars, shows that the average number of miles traveled by each freight car in the country, daily, is about 25. Some of the roads, however, include in the mileage records the performances of private cars, so that the actual average of cars owned by the roads is less than 25 miles per day; and if we were to include the car performance on the 31 per cent. of the railroads which have not been included in the present computation the resulting average would, it is believed, approximate 20 miles per car per day.

Mr. Midgley estimates that if improved methods were employed in place of the mileage basis for compensation, the performance of these cars could be increased 30 per cent.; or, to be conservative, call it 20 per cent., which would mean an addition of 221,962 cars to the present stock of 1,109,808. (This, we assume, is the number of cars owned by the railroads from which the statistics have been gathered.)

From September to January freight cars are worth $3 a day; and it is assumed that they are worth an average of $2 a day throughout the year. On this basis ($2) the service of 221,962 additional cars would have been worth to the railroads of the country in the last three months of 1901 the sum of $40,841,008; from which, says Mr. Midgley, it appears that by improvident methods an enormous sum was lost.

Mr. Midgley says that the low average performance of freight cars now is due partly to the existence of old cars which shippers refuse when modern equipment is obtainable.

He finds that one road in New England which earns $17,088 annually per mile of road on freight owns only 11.4 freight cars per mile of road; so that its freight earnings would appear to be $4.12 per car per day; but this average is due to the fact that the company borrows many more cars than it lends. The debit balance for car hire for the year was $687,853. Assuming that the average rate paid for borrowed cars was 6.5 mills per mile (part of the cars were private cars costing 7.5 mills) 105 millions out of the 171 millions of car miles must have been made by foreign cars.

The Tractive Power of Locomotives.

BY EDWARD C. SCHMIDT.*

In the *Railroad Gazette* for Jan. 17 and 24 last, there was published a formula for finding the draw-bar pull of any locomotive. This formula was first published by Prof. W. F. M. Goss in a paper presented before the New England Railway Club on Dec. 3. The equation there given is as follows:

$$t = 161\frac{H}{S} - 3.8\frac{d^2L}{D} - W.(2+\frac{1}{6}S) - 0.11\,S^2$$

in which,

t = Tractive force in pounds equivalent to cylinder power, corrected for all losses between cylinders and draw-bar, including machine friction, resistance of rolling load and atmospheric resistance, i.e., t = available pull at tender draw-bar.

H = square feet of heating surface in boiler.

S = speed in miles per hour.

d = diameter of piston, in inches.

L = length of stroke, in feet.

D = diameter of drivers, in feet.

W = tons weight of rolling load, including that on trucks and tender; but excluding that on drivers.

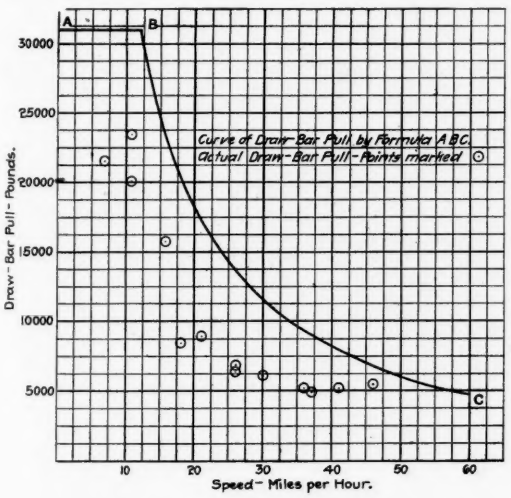
"No value of t thus obtained should be considered practicable if greater than one-fourth the weight on drivers."

This formula has been applied to determine the draw-bar pull, at various speeds, of four locomotives whose dimensions are given below. The calculated draw-bar pull thus obtained was compared with the actual draw-bar pull determined in tests of these engines made by the Railroad Engineering Department of the University of Illinois with Test Car No. 17 on the Illinois Central. The results of these two methods of determining draw-bar pull are shown in the appended tables and curves.

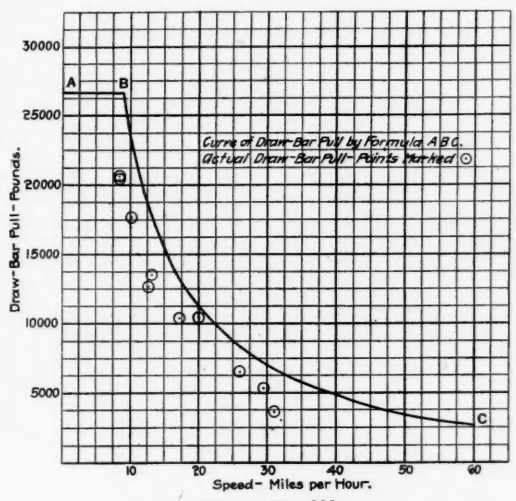
*Assistant Professor of Railroad Engineering, University of Illinois.

GENERAL DIMENSIONS OF LOCOMOTIVES TESTED.

	Engine No. 35.	Engine No. 489.	Engine No. 639.	Engine No. 640.
1. Type of engine	10-wheel.	Mogul.	Consolidation.	12-wheel.
2. Total heating surface, square feet = H	2,396	1,531	3,211	3,500
3. Diameter of piston, inches = d	20	19	23	23
4. Stroke of piston, feet = L	2⅛	2⅛	2½	2½
5. Diameter of drivers, feet = D	5.25	4.71	4.75	4.75
6. Total weight of engine, lbs.	164,400	126,000	203,000	221,450
7. Total weight of tender, lbs.	102,000	80,000	105,000	105,000
8. Weight on drivers, lbs.	123,900	106,400	184,800	181,400
9. Weight of "rolling load," lbs.	142,500	99,600	123,200	145,000
10. Weight of "rolling load," tons = W	71.25	50	61.6	72.5
11. Tractive force, when taken as one-fourth weight on drivers, lbs.	30,975	26,600	46,200	45,350
12. Date of building	1899	1896	1899	1899



Engine No. 35.



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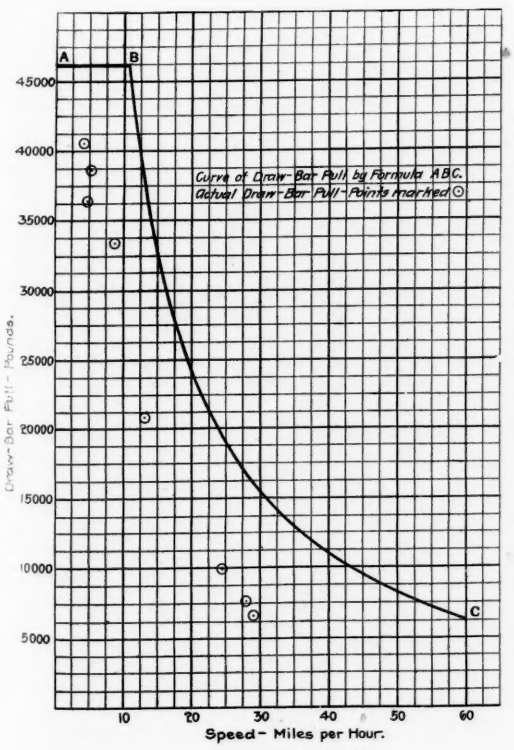
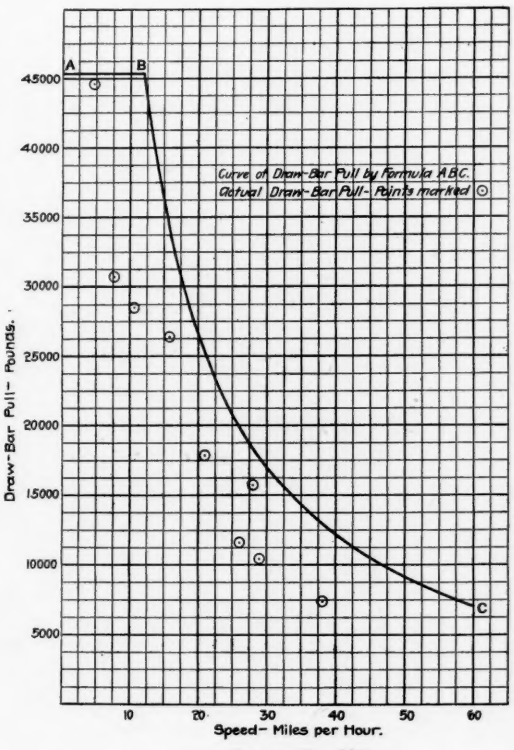


Engine No. 639.



Engine No. 640.

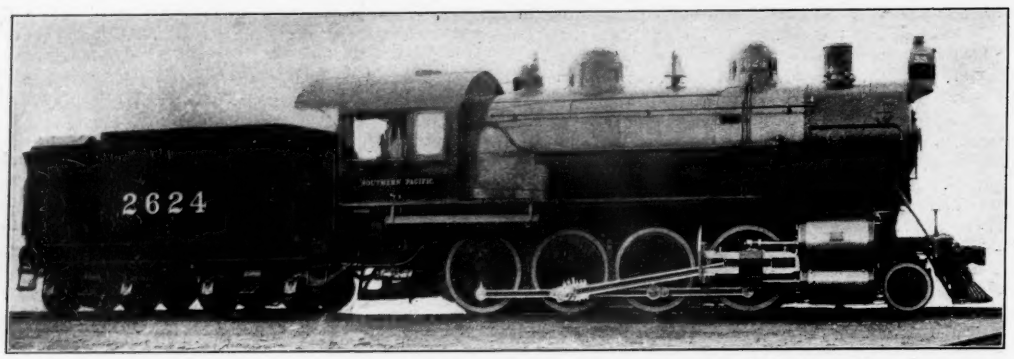
Diagrams Showing Comparison of Results of Dynamometer Car Tests and Prof. Goss' Formula.

Comparison of Results of Dynamometer Tests and Prof. Goss's Formula.

Observed speed, m.p.h.	Actual draw-bar pull as given by dynamometer Car. Pounds.	Draw-bar pull calculated by formula. (t) Pounds.	Correction to be applied to calculated pull, t. Per cent.	Remarks.
		Engine No. 35.		
30	6,090	11,580	—47	
26	6,830	13,630	—50	
18	8,470	20,360	—59	
10.7	23,470	35,090	—24	†
41	5,200	7,920	—34	
46	5,500	6,790	—19	
10.7	20,050	35,090	—35	†
21	8,910	17,250	—48	
26	6,390	13,630	—53	
6.7	21,540	56,670	—30	†
15.7	15,750	23,540	—33	
36	5,200	9,330	—44	
37	4,900	9,020	—46	
		Engine No. 489.		
28	3,790	7,760	—51	‡
26	6,540	8,460	—22	
36	2,600	5,680	—54	‡
29.5	5,350	7,280	—26	
31	3,640	6,860	—47	
13.2	13,520	17,810	—24	
12.7	12,630	18,560	—32	
17.2	10,400	13,430	—22	
10.2	17,600	23,340	—24	
8.4	20,650	28,550	—22	†
8.4	20,500	28,550	—23	†
20	10,400	11,400	— 9	
		Engine No. 639.		
28	7,720	16,900	—54	
29.2	6,680	16,130	—57	
13.2	20,800	37,830	—45	
26	10,700	18,360	—41	‡
24.5	9,950	19,600	—49	
4.7	36,400	108,760	—21	†
5.2	38,620	98,200	—16	†
8.7	33,430	58,140	—27	†
4.2	40,560	121,860	—12	†
38	1,930	11,870	—84	‡
		Engine No. 640.		
7.7	30,750	71,880	—32	†
28	15,750	18,500	—15	
26	11,590	20,080	—41	
29	10,400	17,760	—41	
21	13,670	25,320	—46	‡
10.7	28,520	51,320	—37	†
5.7	44,570	97,580	— 2	†
15.7	26,440	34,470	—23	
21	17,830	25,320	—29	
32	6,830	15,900	—57	‡
38	7,430	13,000	—43	
40	5,050	12,220	—59	‡
36	4,460	13,870	—67	‡

In the preceding tables the draw-bar pull, calculated by the formula, at points, marked thus (+) is greater than one-fourth the weight on drivers, in which case it is considered that the result given by the formula is equal to one-fourth of the weight on drivers, and this last figure is used to establish the percentage of correction. The figures given in the tables apply to points which were selected from the dynamometer records of tests of the four engines at places where both pull and speed were nearly uniform. The engines were loaded in each case with their maximum tonnage rating. The figures marked thus (‡) apply to points on the road at which it is either certain or probable that the engines were being worked with partially closed throttle and at which, therefore, the formula may not be expected to apply. Such points are not plotted on the diagrams.

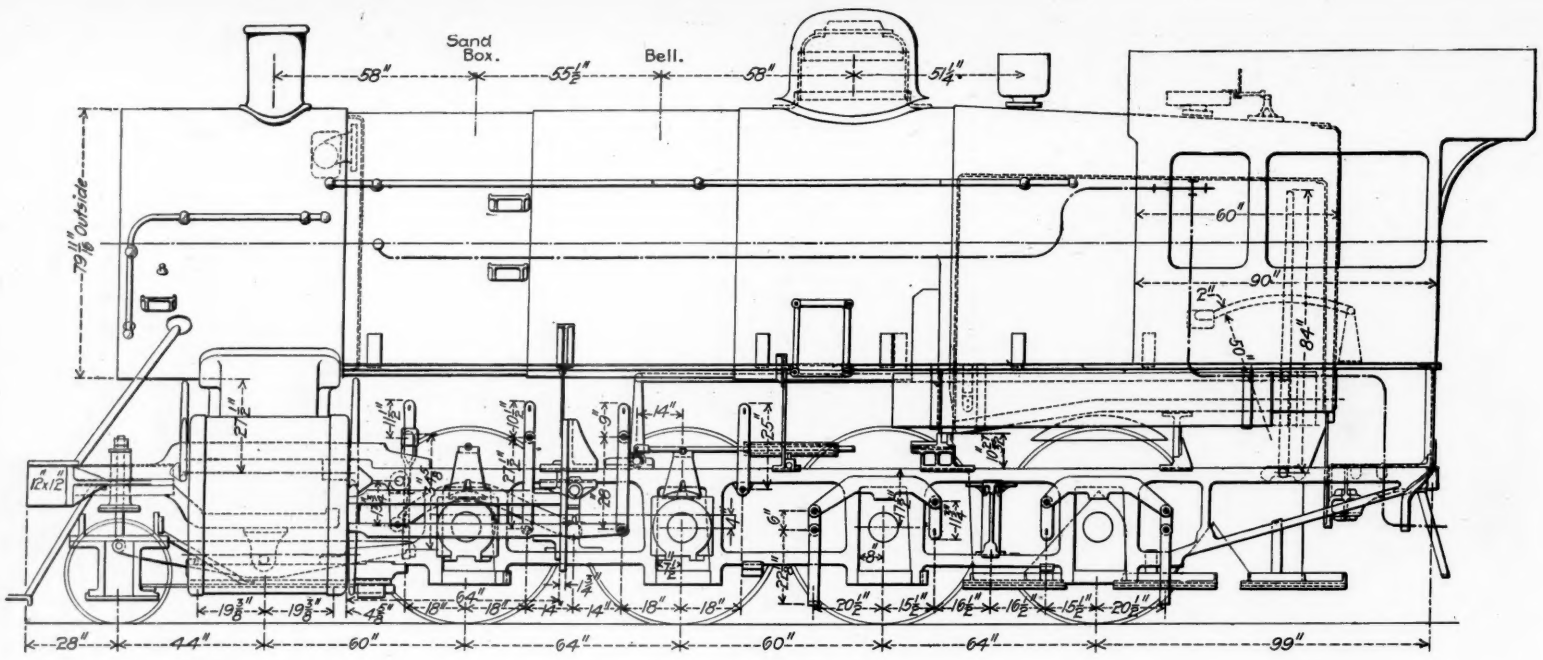
The comparison between the actual and the calculated draw-bar pulls is more clearly shown in the diagrams, where the curves A, B, C, represent the draw-bar pull at various speeds as given by the formula, and the actual draw-bar pull is shown by the plotted points. For these four engines the formula gives values for draw-bar pull which are, in general, from 20 per cent. to 50 per cent. too great.

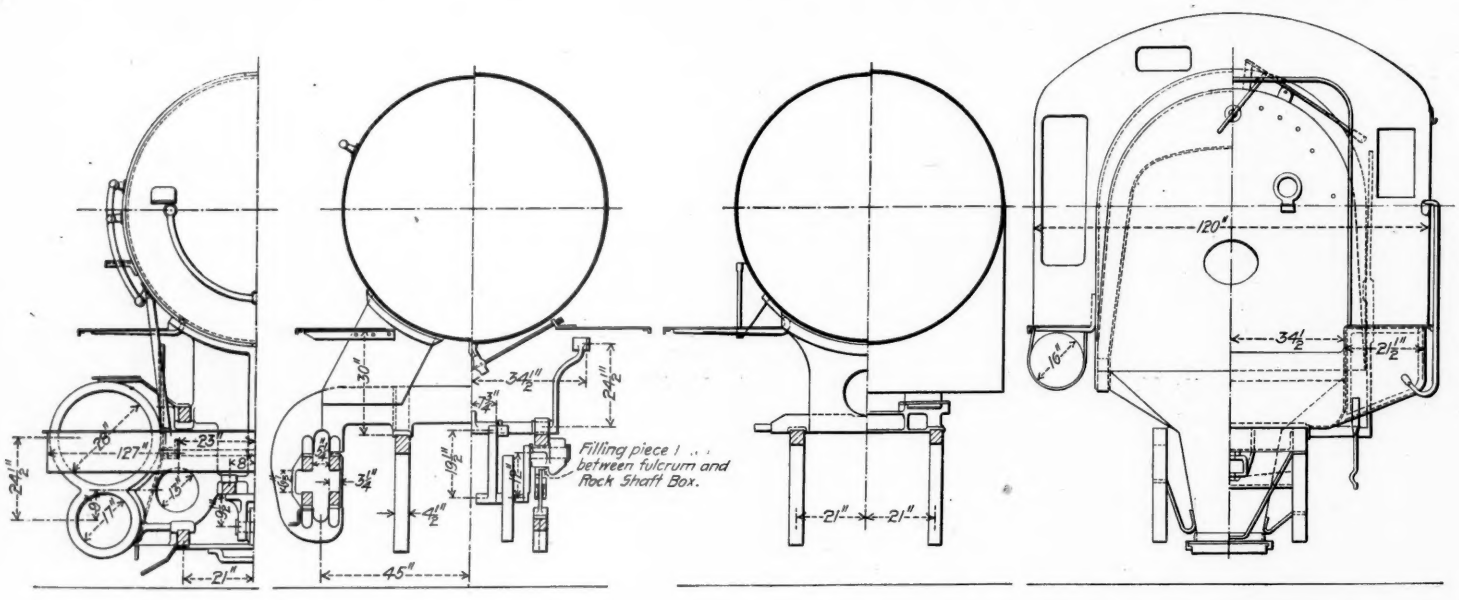


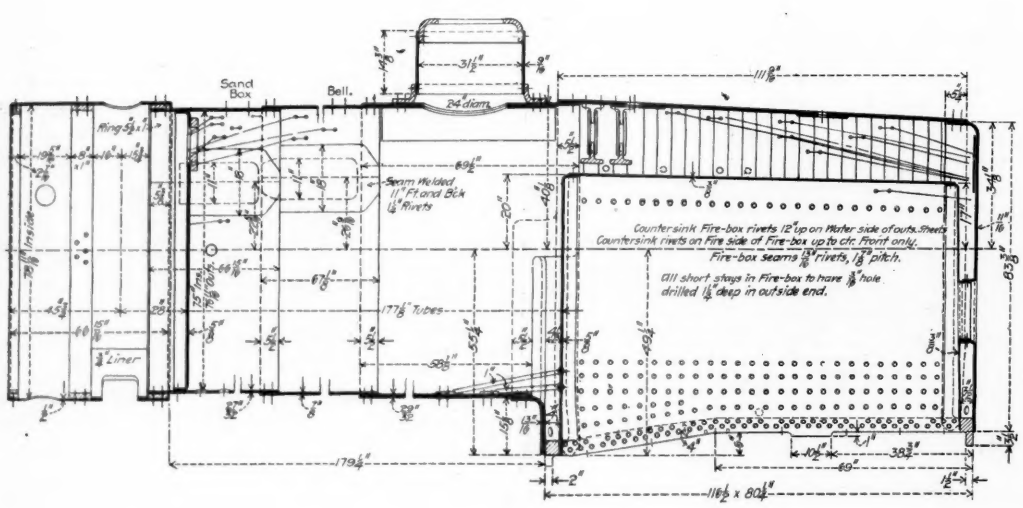
Consolidation Locomotives for the Southern Pacific.

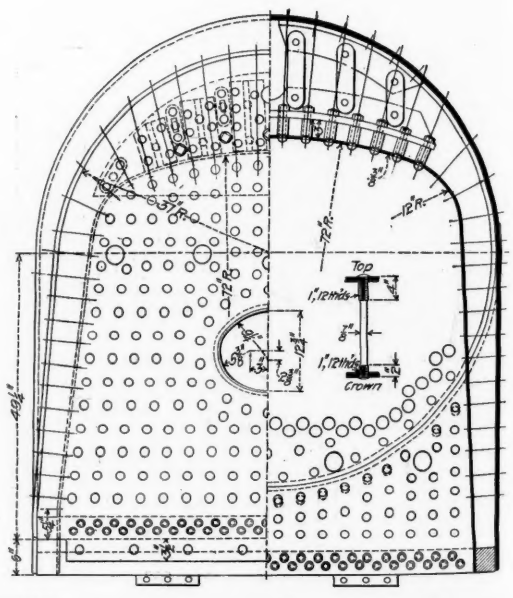
The Baldwin Locomotive Works are now delivering some heavy compound consolidation locomotives to the Southern Pacific, one of which is shown by the accompanying engravings. This locomotive is designed to burn bituminous coal and has a fire-box 6 ft. ½ in. wide and 9 ft. long. The total heating surface is 3,599 sq. ft. divided, 208 sq. ft. of fire-box heating surface and 3,391 sq. ft. of tube heating surface. The grate area is 54.5 sq. ft., making 66 sq. ft. of heating surface for each foot of grate.

The total weight in working order is 204,800 lbs., with 181,200 lbs. on the driving wheels, the cylinders are 17 and 28 x 30 in., the driving wheels 57 in. and the working steam pressure is 200 lbs. The tender in working






Sand Box
Bell.
24" diam.
Seam Welded 11" Ft and Btk 1⅛" Rivets
Countersink Fire-box rivets 12" up on Water side of outs. Sheets
Countersink rivets on Fire side of Fire-box up to clr. Front only.
Fire-box seams ⅝" rivets, 1⅛" pitch.
All short stays in Fire-box to have ⅜" hole drilled 1¼" deep in outside end.
177⅛" Tubes
179½"
116½ x 80½"



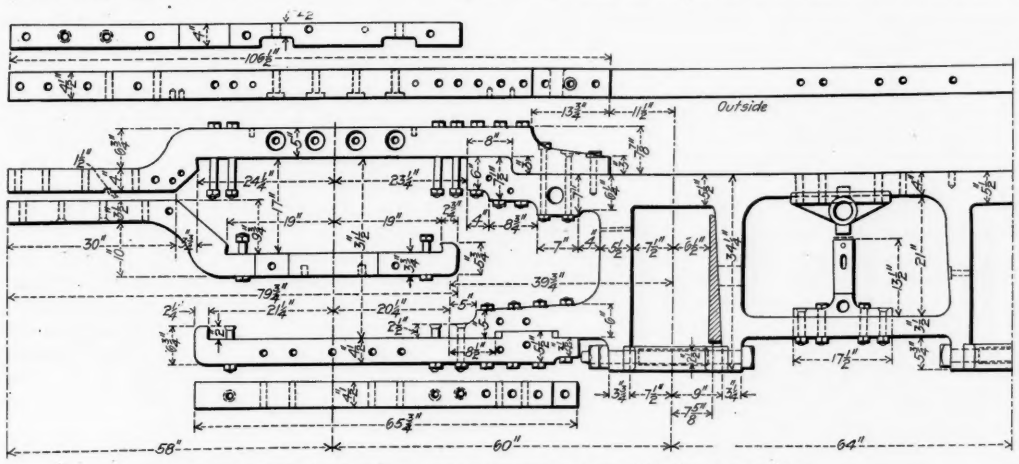
Compound Consolidation Locomotive for the Southern Pacific Company.

order weighs about 120,000 lbs. and has a capacity for 6,000 gals. of water and 10 tons of coal.

The most interesting features of this design are shown by the erecting drawing and the detail drawings of the boiler and front frames.

Other general dimensions are as follows:

Wheel base, total, of engine	24 ft. 4 in.
Wheel base, driving	15 ft. 8 in.
Wheel base, total (engine and tender)	53 ft. 2 in.
Height, center of boiler above rails	9 ft. 4 in.
Drivers, material of centers	Cast steel
Truck wheels, diameter	30½ in.
Journals, driving axle, size	10 x 12 in. main; others 9 x 12 in.
Journals, truck axle, size	6 x 10 in.
Main crank pin, size	6½ x 7 in.
Piston rod, diameter	4½ in.
Kind of piston rod packing	U. S. Metallic
Main rod, length center to center	10 ft. 6¾ in.
Steam ports, length	29¾ in.
Steam ports, width	1½ in.
Exhaust ports, length	29¾ in.
Exhaust ports, width	4½ in.
Bridge, width	3⅛ and 3 in.
Valves, kind of	Balanced piston
Valves, greatest travel	5½ in.
Valves, outside lap	H. P., 1⅛ in.; L. P., ⅞ in.
Valves, inside clearance	H. P., ¼ in.; L. P., ⅜ in.
Valves, lead in full gear	H. P., 0 in.; L. P., ⅛ in.
Boiler, type of	Straight
Boiler, material in barrel	Steel
Boiler, thickness of material in barrel	27/32, ⅞ and 29/32 in.
Boiler, diameter of barrel	76 11/16 in.
Seams, kind of horizontal	Butt joint, sextuple riveted
Seams, kind of circumferential	Double riveted
Thickness of tube sheets	⅝ in.
Thickness of crown sheet	⅝ in.



Front Frames—Southern Pacific Compound Consolidation Locomotive.

Crown sheet stayed with	Radial stays
Dome, diameter	31½ in.
Fire-box, depth front	75¼ in.
Fire-box, depth back	66¼ in.
Fire-box material	Steel
Fire-box, thickness of sheets	⅜ in.
Fire-box, brick arch	Yes
Fire-box, water space, width	Front, 4 to 4½ in.; sides, 3½ to 6 in.; back, 3½ to 4½ in.
Grate, kind of	Rocking
Tubes, number	442
Tubes, material	Steel
Tubes, outside diameter	2 in.
Tubes, length over sheets	14 ft. 9⅛ in.
Smoke-box, diameter	75 11/16 in.
Smoke-box, length	73¾ in.
Exhaust nozzle	Single
Exhaust nozzle	Permanent
Exhaust nozzle, diameter	5½ in.
Exhaust nozzle, distance of tip below center of boiler	8¼ in.
Netting	Wire
Netting, size of mesh	4 x 4 in.
Stack	Taper
Stack, least diameter	16 in.
Stack, greatest diameter	18 in.
Stack, height above smoke-box	2 ft. 1 in.

Tender.

Type	Eight-wheel with swivel trucks
Tank capacity for water	6,000 gal.
Coal capacity	10 tons
Kind of material in tank	Steel
Thickness of tank sheets	¼ and 5/16 in.
Type of under-frame	Iron
Type of truck	Arch bar
Truck with swinging motion or rigid bolster	Rigid
Type of truck spring	Double elliptic
Diameter of truck wheels	33½ in.
Diameter and length of axle journals	5½ x 10 in.
Distance between centers of journals	77 in.
Diameter of wheel fit on axle	6⅞ in.
Diameter of center of axle	5⅞ in.
Type of truck bolster	Cast steel
Length of tank	20 ft. 2 in.
Width of tank	9 ft. 6 in.
Height of tank, not including collar	5 ft. 0 in.
Height of tank over collar	6 ft. 0 in.
Type of back draw-head	M. C. B. Vertical plane
With or without water scoop	Without

Wisker Indicted for Manslaughter.

The February Grand Jury of New York County, on Friday last, reported an indictment of engineman John M. Wisker for manslaughter in the first degree, and also for criminal negligence; and this is the only report which the Grand Jury makes on the collision in the Park Avenue Tunnel. The District Attorney had laid before it a memorandum setting forth that the company had maintained a nuisance in not equipping the tunnel with suitable signals, in neglecting to adopt rules and regulations for preventing collisions, and in not enforcing obedience to rules. This document, if signed by the Grand Jury, would have been an indictment against the company for maintaining a nuisance; but the document was returned marked "dismissed."

The Grand Jury considered this subject for five days and examined 36 witnesses, including officers of the road and enginemen. Wisker was offered the privilege of appearing, but his lawyer decided that he should not.

District Attorney Jerome is criticized by the New York daily papers for not having secured the indictment of some person or persons, connected with the road, other than Wisker. He replies that the jury, of 23 men, was exceptionally intelligent and that the law was fully and clearly explained to them. He was asked if the question of indicting officers of the road would be presented to the next (March) Grand Jury, but replied that in view of the fact that it had been impossible to get twelve men out of the present 23 to charge the officers with criminal negligence, it seemed very unlikely that it would be possible to find a petit jury of twelve men who would (unanimously) agree in condemning one or more officers of the road.

The *Herald* interviewed the members of the Grand Jury but secured very little information. One of the jurors said that enginemen had testified that they could find their way through the tunnel by watching the openings. Jurors who evidently had voted against indicting Wisker said that they had faithfully tried to impress their views upon their fellow jurymen. The jurors, while holding Wisker guilty, hoped that the court would be lenient with him.

The *Evening Post* says that in deciding that the officers of the road were not negligent in assigning Wisker to this run, the Grand Jurymen were influenced by the testimony of an experienced engineman that Wisker had fired for him six months and during this time had been allowed to run the engine about 50 times, and to take the train into the station as if it were his own. Whether all of the 50 trips were through the tunnel is not clearly stated.

District Attorney Jerome said that personally his opinion was that if the green signal was beclouded, so that Wisker could not see it, the officers of the road were guilty of manslaughter. This, apparently, is the basis of Mr. Jerome's proposition or memorandum which he laid before the jury; that is to say, a smoky atmosphere or a cloud of steam around a signal is a nuisance. The refusal of the Grand Jury to adopt Mr. Jerome's view that the signals are inadequate appears to be based mainly on the fact that no collision has occurred during the past 10 years.

The District Attorney of Westchester County had offered to aid Mr. Jerome, and had been shown the evidence, but the two attorneys agreed that nothing further could be done.

The *Times*, *Herald*, *World* and *Evening Post* severely condemn the Grand Jury and the District Attorney for not indicting the officers of the road. The gist of the criticisms of these and other papers is shown in the following extracts. We do not print these extracts as being words of wisdom, but simply to show how the matter is presented to the public.

A grave failure of justice—this is what the action of the Grand Jury in the matter of the New York Central disaster amounts to. It has indicted the engineer, but allowed the high officials to escape scot free. It may be that it is impossible to hold the directors of a railroad company to responsibility for such a crime as the tunnel disaster, and that it would be impracticable and even unjust to attempt to punish Messrs. Morgan, Depew, Rockefeller, and Vanderbilt for the negligence of their operating officers. But unless railroads are to be relieved of all responsibility for the safety of their passengers, the liability must attach to some officials, and in our opinion it should rest primarily upon the executive officers.—*Evening Post.*

The result is a travesty on justice. Public opinion will so regard it. That Mr. Jerome feels that he has no further official interest in the matter is, if anything, even more surprising than that the Grand Jury should have failed to recognize in the evidence before it any warrant for adverse comment upon the policy of the management. —*New York Times.*

The public was not prepared to see a Grand Jury indict the grimy man in the cab and let the managers of the road go without a word of censure or rebuke. It must be assumed that the jurors acted in accordance with their unbiased judgment on the evidence presented; but, since they did not hold the railroad officials to any accountability, it would seem scarce worth while to make a scapegoat of the unfortunate engine driver.—*Herald.*

It is a farcical indictment. To prosecute this man, whose misfortune, not crime, it was that some grossly negligent official "higher up" put him where he was not fit to be, and to let everybody else go free, is a proceeding that flouts the public sense of right and mocks justice.—*World.*

The Grand Jury of New York takes a very different view of the disaster from that of the Coroner's jury. The officials certainly seemed the guilty ones, while the engineer was as much a victim of tunnel conditions as the passengers who were killed. Wisker, of course, will never serve a term for manslaughter. No jury in New York would convict him.—*Springfield* (Mass.) *Republican.*

The reader will recall that the Coroner's Jury declared the officers of the road guilty of the negligence which caused the collision of January 8, and did not censure Wisker. The State Railroad Commissioners found that Wisker lacked reasonable presence of mind, and had unmistakably violated a well-known rule; that the company was grossly negligent in putting on this train an engineer of such limited experience and unascertained capacity; that the company had been negligent in failing to closely examine the qualifications of new engineers, and lax in discipline.

Wisker was admitted to $5,000 bail for trial on March 10. The reports say he pleaded not guilty on a charge of manslaughter in the *second* degree. A prominent business man, coming into court after bail had been given, urged that he be allowed to furnish the security; and, being denied that privilege, he wanted to furnish half of it.

The North Eastern of England.

The ninety-sixth half-yearly general meeting of The North Eastern Railway was held in York, on Friday, Feb. 14, Sir Joseph W. Pease, Bart., M.P., in the chair. Concerning the recent visit of Mr. Gibb and his party to this country the Chairman said: "At the last half-yearly meeting I mentioned that our General Manager and some of our chief officials proposed to visit America in order to study the question of railroad working there, and to report to the Board upon them. Mr. Gibb and his colleagues were in America 31 days, and during that time they traveled upwards of 4,000 miles, visiting most of the principal railroad systems. They saw and heard and learned a great deal. I do not propose to describe in detail to you their experiences and conclusions. It would be too long a story, and this is not a suitable opportunity. I may say, however, that the results of the visit will, we believe, have fulfilled the expectations of the Board. The information which they have brought back is useful, and has practical value for us. I am not disclosing a secret when I say that they returned from America much impressed with what they saw, and with a frank admiration for American railroad working, especially in the department of goods and mineral carrying. Whilst on this subject I would like to acknowledge the great courtesy our officials received in all quarters. They were received in a friendly and most generous spirit, information was placed at their disposal, and we are greatly indebted to those we must look upon as our friends, the American railroad officials, for the invariable kindness which they showed to our officers during their visit. (Applause.) We hope some of the Americans will pay us a return visit and allow us to reciprocate their friendliness. Although there is much to admire in American railroad working, they would be the first to acknowledge that we have something to teach as well as to learn. In coal shipping, for example, which is our greatest business, Mr. Gibb tells me that he was much pleased to find that the very best and latest American methods of shipping coal were identical with those at our own Tyne Dock.

"Our larger engines might have larger trucks and larger loads attached to them with commendable advantage to the traffic expenses, and we think the adoption of this policy will turn out to be advantageous not only to our customers, but our shareholders. We are trying mineral wagons of 40 tons, and I need not tell you that the wear and tear, which is so important a thing in railroad traffic, is very much less on a 40-ton wagon than what it is on an eight-ton wagon. It is too soon to speak with confidence, but one of our largest customers in the north is quite ready to try these 40-ton wagons, and we have samples on order. I do not want to alarm anybody, but I must say that there are great difficulties in the way of such changes. Traders' establishments have been fitted for the accommodation of 10-ton wagons, and not for those of 40 tons, but I believe that many of our customers, if not all, have land round their works sufficient to accommodate the larger wagons, and it is certain will hold more for the same service than the smaller wagons. We do not want to go too hurriedly into this matter, for we do not want to hazard any expenditure on what may prove to be only an experiment. What we are trying to do is to decrease those working expenses which are still upon us year after year, and we are trying the best means we can devise to reduce them consistent with the carrying on of our traffic satisfactory.

"Mr. Gibb—and our officers generally, but Mr. Gibb especially—has been looking at the question of reorganization. We have been working for a long time on our railroad on what we call our old plan, but Mr. Gibb had given the matter careful thought before he left for America. When he came back from America he pulled his papers out again pretty rapidly, and the scheme he placed before us was approved by the Board. I will explain the principle in a few words. It is that it divides our staff into what may be called the commercial and technical branches—namely, one department is to look after getting our traffic, and the other is to get it over the railroad. We have given great attention to this plan, and I have very little doubt in my mind that it will work well, and that our customers, as well as ourselves, will feel the benefit of it."

It is expected that on Saturday, March 8, the Great Western of England will run a train from Plymouth to London, 245 miles, without a stop. New track tanks have been laid between Dunston and Taunton to make this possible. The train is a special to carry the King and the Queen. The Great Western has long been noted for running trains regularly between Exeter and London, 194 miles, without a stop.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

CONTRIBUTIONS—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

ADVERTISEMENTS—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and these only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.*

We spoke lately of the new Cuban railroad law. The Railroad Commission was sworn in February 27 before the Chief Justice of the Supreme Court, in the office of the Governor General of Cuba, and held its first meeting on that day. The law is radically different from the old Spanish law, although taking a good deal from it. Probably the most important feature of the new law is in cutting red tape as regards granting concessions, declaration of public utility, expropriation of private property, etc. In these matters much has been taken from the Canadian and United States laws. The whole law is one of adaptation, and while those best informed do not think it by any means perfect they do think it fair and practical.

Few persons have been long engaged in railroad work without getting some interest in locomotive sparks. Some have concerned themselves with furnace conditions affecting spark production, or with front-end arrangements designed to arrest their progress. Others have studied their composition or have experimented in burning them as fuel under stationary boilers, and still others have been perplexed by questions growing out of the possibility of accidental fires resulting from their distribution along the right of way. Any of these persons will find something to interest them in a little book entitled "Locomotive Sparks," prepared by Professor W. F. M. Goss, and soon to be issued by John Wiley & Sons, of New York. By the courtesy of the publisher the *Railroad Gazette* will publish a few extracts from the advance sheets of this book. An installment appeared in our last issue and a second installment will be found on another page.

The Brooklyn Bridge Once More.

Last Tuesday the Commissioner of Bridges of New York, Mr. Lindenthal, made public his plan for taking care of the passenger traffic of the Brooklyn Bridge. While this is essentially a local matter, yet it is one which affects constantly and seriously a million or two of people, and it is an engineering and transportation matter of great difficulty and consequently interesting to engineers and transportation men who are not directly concerned with it. Therefore we feel justified in giving to it a little space.

Last autumn a board of experts handed to the then Commissioner of Bridges a plan for the relief of the congestion at the New York terminal. A description of the plan brought forward by that board may be found in the *Railroad Gazette* of Oct. 18. This was based on certain fundamental principles:

First, it was proposed to cease to consider the New York end of the bridge as a terminal (so far as that is possible), and to establish intercepting and distributing stations at various places on the island, close to the main centers of traffic.

Second, it was proposed to connect the old Brooklyn Bridge and the two bridges now building by an elevated railroad, thus making possible a circulation of trains and securing some important advantages in the distribution of traffic.

Third, it was proposed to prevent that part of the accumulation of crowds at the trolley loops, which is due to the fact that people now have frequently to wait for the passage of several cars before the car which goes to their destination arrives on the loop at which they are waiting.

Fourth, it was proposed to separate incoming and outcoming traffic and to prevent crossing the trolley loop tracks at grade.

The Board set to work to meet these fundamental requirements by the simplest, cheapest and most expeditious methods, realizing the importance of speed as well as economy. They put out of mind the notion of building a monument; they aimed to bring forward a plan such that relief would begin as soon as a small part of the new structure was built; they aimed to bring forward such a plan that there would be no delay in condemnation or purchase of real estate, and further such that there would be no delay in financing the plan.

The specific means suggested included building an elevated railroad northward, parallel with Broadway and as near as possible to Broadway, namely, along Centre street, which road would not only provide intercepting stations but would connect the three bridges. Further, they proposed to build a southerly elevated line which would provide an intercepting station south of the Post Office. Finally they proposed a simple and comparatively economical rearrangement of the trolley loops on the bridge. It was estimated that this whole plan could be carried out for something less than three million dollars.

The plan now proposed by the Bridge Commissioner is much more comprehensive. He accepts the principle of running trains through the bridge station instead of treating it as a terminus, and also the principle of connecting at least two of the bridges. This he proposes to accomplish by the purchase of a considerable piece of real estate, including the *Staats Zeitung* building (which has been for years a formidable obstacle in the way of bridge improvement), and then by carrying his line northward on the same structure which now carries the Manhattan elevated road.

He proposes to take off the trolley cars from the bridge and to substitute for them moving platforms, going constantly at ten miles an hour, and which may be boarded or left through the intervention of other moving platforms going at seven and one-half, five and two and one-half miles an hour each. Finally, he proposes to build on the property now owned by the city and to be bought, an immense city building, perhaps 16 stories high. We should add, too, he proposes to carry an elevated railroad from Bridge No. 3 across the city to West street, through Canal street. There will be no connection, however, for elevated cars to pass from the other bridges to this one.

It is estimated that this plan may be carried out for $14,500,000.

The Commissioner disapproves of the plan brought forward by the Board for several reasons, one of which is that he thinks that an elevated railroad up Centre street should not be permitted. Concerning this it is enough to say now that an elevated railroad along Centre street would serve the people far better than one farther east. The ideal connecting road would be along Broadway, but that, of course, is out of the question. The next best thing is to have it as near Broadway as possible. The Commissioner says that the Board's estimate of the cost of carrying out their project is too low; that in fact it would cost $6,000,000. We might just as well say that his would cost $25,000,000. The fact is that the Board made its estimate with considerable care, basing the cost of the structure on tons of steel erected, and basing the property damages on the average experience of the Manhattan Elevated in the lower part of New York City.

It will be observed that the Commissioner does not agree with several editors of daily newspapers, in New York City, in the fundamental proposition that not another yard of elevated railroad shall be built in that town. He simply objects to building an elevated railroad in certain localities, but recognizes the propriety of elevated railroads in other localities.

We can see great objections to his plan for taking his road northerly along the structure of the Manhattan, apart from the serious fact of putting it away from the line of travel. Obviously, in the narrow streets it will take away from the lower stories a considerable part of the light that they have left; and along all of the streets occupied it will involve a new set of property damages. In this particular it will have little or no advantage over the Centre street route. We have not looked into the details of arranging stations for the two different kinds of service to be carried on the one structure, and through the one street, and doubt if such details have been worked out; but it seems that there might be difficulty in arranging the stations.

The Commissioner's plan provides for two tracks to take the bridge cars northward. But without some means of turning cars not far from the end of the old bridge it will be found impracticable to give sufficient car service in the crowded hours, inasmuch as traffic over the old bridge, and serving the regions south of the latitude of that bridge, is very much greater in volume than the traffic to the north. It would be impracticable, therefore, to run cars enough to take care of the business on the old bridge without running a ruinous empty car mileage over the upper bridge.

The moving platform is, of course, the most capacious method of transportation that anybody has ever thought of. Theoretically, it can handle many more people in a unit of time or space than can be handled by any other means, but the mechanical difficulties of maintaining and working that kind of a contrivance over a structure, as long as the Brooklyn Bridge, are more numerous and more formidable than most mechanical engineers would care to tackle; and the expenditure of energy necessary to handle such a platform with its auxiliary differential-speed platforms would be prodigious.

Of course, this notion of serving the Brooklyn Bridge by a moving platform, like the notion of building a huge city office structure for the terminal station, is not novel. Both of these plans have been suggested before, and the plan of a monumental terminal building has been suggested many times. Perhaps the time has come to do both of these things, but we doubt it extremely.

The Grand Jury on the Tunnel Disaster.

Engineman Wisker, runner of the Harlem train which collided with a train of the New Haven road in New York city on Jan. 8, and killed 17 passengers, has been indicted for manslaughter. The action of the Grand Jury, with some comments on it, will be found in another column. The newspapers are indignant, and in some cases seem to be almost in a state of fury, because the officers of the road were not indicted. After the voluminous statements of facts that have been published, and after the plain-speaking report issued by the Railroad Commissioners—which, by the way, seems to get very little notice—it is probably idle to expect that anything that can be said now will cause those editors to take a rational view of the case; but for the benefit of those of their readers who see the *Railroad Gazette*, we will briefly defend Mr. Jerome. This can be done without either helping or harming the railroad officers for whose blood the editors are thirsting.

The newspaper trial includes two separate cases, while the judicial trial has to do with only one. Wisker ran past a signal (at 63d street) which by reason of the existence of numerous light openings can be easily located; and it was daylight. The newspapers, in blaming the company, keep dwelling on those other cases, brought out at the inquest, where there may be question about the adequacy of the signals. Mr. Jerome had to confine himself strictly to the first mentioned case.

Whether or not the statutes are such that he might indict the company for maintaining inadequate signals at, for example, the 86th street station, in the side tunnels (where nobody has been killed), is a subtle question which perhaps a layman had better not try to answer. The Railroad Commissioners, in their report, made it plain that they deemed improvement necessary in those signals which are difficult to locate, and also in the discipline of the runners generally, but it is to be borne in mind that this feature of the case has nothing to do with the collision of Jan. 8, except that it was the inquiry concerning that collision which first brought these other facts to notice.

Confining himself to this one collision, and to the evidence presented, the District Attorney could take no action toward indicting the officers, except for being guilty of a criminal offense in assigning a poorly qualified engineman to this important run. Mr. Jerome tells the reporters that if the company (or its officers) was unlawfully omitting to perform any duty the result of which omission was endangering the safety of a considerable number of persons, it was guilty of misdemeanor; but he did not, apparently,

put forth any great effort to find out all the particulars about the omission to assign a competent engineman to this run, or what officer or officers should be charged with the responsibility for the omission; and it appears that the members of the Grand Jury were satisfied, from the fact that Wisker had been coached for fifty trips, that there had been no negligence on the part of the appointing power. The Railroad Commissioners appear to have been indifferent as to what officer or officers should be blamed for the derelictions specified in their report.

We cannot see how the jurymen could avoid indicting Wisker, unless they found him insane or feeble minded, and there has been no suggestion of that. As he is a conscientious man and his crime is largely one of ignorance, most people will join the members of the Grand Jury in the hope that the Court will be lenient with him; but it is noticeable that he has made no public statement whatever, except one or two sentences to the bystanders at the time of the collision; and the sympathy which finds expression in the newspapers is based wholly on the indignation—largely illogical—which is felt towards his superiors; not on any actual knowledge of the character of his offense. It would be a pity to have the matter settled in this way, even if it were settled justly, for the public interest demands that, by means of a public trial, the real facts bearing on the whole case shall be brought out.

While the Railroad Commissioners did not name any officer or officers, they were very pronounced in their opinion that there had been negligence in the selection and training of enginemen; so that we have here what appears to be a grave difference of opinion, between the two investigating bodies concerning the facts. Possibly this is to be explained by the different attitudes of the two bodies. The Grand Jury was considering the question of punishing, under the criminal statutes. The Railroad Commission was, presumably, looking chiefly to the correction of discipline for the future. The layman of the Grand Jury may perhaps have been taking a reasonable layman's view, in holding that coaching for 50 trips constituted adequate training for Wisker; but the fact remains that an engineman of a good deal of intelligence, sober and in his right mind, not wearied by overwork, or anything else, committed a terrible act. The two different conclusions may be all right from the standpoint of the criminal law, but the real question concerning a remedy still remains.

Of the numerous vital questions concerning the best way to prevent such men from making such mistakes in the future (which questions were set forth in our editorial of Jan. 17), only one has yet been answered; the one concerning length of service. It has been shown that Wisker had not had a sufficiently long preliminary term of less exacting work. Every railroad officer who studies the case will take this view, whatever the Grand Jury may say. The answers to all the other questions are condensed into the statement, by the Railroad Commissioners, that the company had been negligent in selecting, training and punishing its employees. Condensation is good, but this is too much of a good thing. The statement suggests a good deal that was not done; but to make the report really instructive it should tell what ought to have been done. Wisker's trial appears now to be the only means through which these points are likely to be brought out.

Annual Reports.

Pennsylvania Railroad.—The report of this company for the year ending Dec. 31 is a record of marvelous development, not only of the company, but also of the communities it serves, as represented in the figures of increasing transportation service. Gross revenues on all lines worked by the company, or affiliated in interest with it, East and West of Pittsburgh, amounted last year to nearly $200,000,000, and net earnings to $65,000,000. On the Pennsylvania railroad proper, gross receipts were above $100,000,000. Tons moved on all lines exceeded 243,000,000, and tons moved one mile were 21,929 millions. Passengers carried amounted to 104½ millions, and passenger mileage ran above 2,369 millions. It is needless to say that the report presents statistics which exceed in amounts those reported by any other railroad corporation in the world. Speaking approximately, the Pennsylvania lines, while comprising about 5 per cent. of the total mileage of railroad in this country, carry about 22 per cent. of the tonnage reported for all the railroads, about 15 per cent. of the ton-mileage and earn about 12½ per cent. of the gross revenues. The following figures show in detail, by divisions, the gross and net revenues on all lines for three years past:

Gross earnings:	1901.	1900.	1899.
Penn. R. R. Co.	$101,329,795	$88,539,827	$72,922,985
Other lines east	30,851,609	26,726,474	25,321,284
All lines east of Pittsburgh	$132,181,404	$115,266,301	$98,244,269
Pennsylvania Co.	29,054,545	25,529,284	22,986,827
P., C., C. & S. L.	24,290,892	22,264,924	21,196,817
Other lines west	13,100,037	12,190,645	9,741,194
All lines west	$66,445,474	$59,970,053	$53,924,838
Total, all lines	$198,626,878	$175,236,354	$152,169,107

Even these great figures do not show the total disbursements for transportation made to the lines controlled by the Pennsylvania Railroad. They do not include, for instance, the receipts of the soft coal carrying roads, the Long Island Railroad, etc., which are now virtually controlled by the Pennsylvania Railroad, although it does not, in each instance, own a majority of the outstanding shares. Adding the receipts of these concerns, which include the Baltimore & Ohio, the Chesapeake & Ohio, and the Norfolk & Western, as well as the Long Island, for the fiscal year to June 30 last, to the revenues reported above for the Pennsylvania Lines for the Dec. 31 year, would give total receipts for transportation service, amounting to $281,760,000 gross and to $94,880,000 net, on lines of 17,225 miles managed by the Pennsylvania Railroad's officers, or in which they have a voice.

The revenues of 1901 show heavy increase in receipts, although the gains, when allowance is made for increased mileage, are not quite up to the records of 1900, though very nearly so. Total gross and net earnings, with the increase in each year, for half a dozen years past, are appended:

	Gross earnings.	Increase.	Net earnings.	Increase.
1901	$198,626,878	$23,390,524	$64,913,492	$10,175,414
1900	175,236,354	20,525,651	54,738,078	9,062,366
1899	152,169,106	16,038,835	45,675,712	4,402,704
1898	136,130,271	7,852,184	41,459,415	4,216,297
1897	128,278,087	4,636,819	40,637,055	822,360
1896	123,641,268	*6,678,086	35,311,939	*4,113,804
1895	130,319,354	12,597,758	39,425,743	4,755,684
Gross increase	$85,041,773			$28,679,141
Net increase	78,363,684			24,565,337

*Decrease.

Average miles worked is not given in the Pennsylvania's reports, but the increase has been from 9,237 miles Dec. 31, 1899, to 10,485 miles on Dec. 31 last, including ferries and canal.

Out of the $198,600,000 gross, reported above, for 1901, net earnings were $64,913,492, and surplus $3,394,381, this being after deductions, besides interest, etc., of very large amounts for extraordinary expenses. The enhancement of over $23,000,000 gross shown above for 1901 is accounted for by divisions, as follows. Pennsylvania Railroad Division, $5,010,688; United Railroads of New Jersey, $1,013,395; Philadelphia & Erie Division, $1,614,600; Buffalo & Allegheny Division, approximately $3,503,000, the line being operated by the Pennsylvania only five months in 1900. Total increase by the Pennsylvania Railroad is thus $12,789,968, and, including all lines East of Pittsburgh, the gain is $16,915,103, or $13,402,000 less the Buffalo Division, to which is to be added $6,475,421, by companies West of Pittsburgh.

Taking the income account of the Pennsylvania Railroad Company with its $101,000,000 of gross receipts, the following comparisons are possible:

	1901.	1900.	Increase.
Gross earnings	$101,329,795	$88,539,827	$12,789,968
Operating expenses	65,259,543	58,099,206	7,160,337
Net earnings	$36,070,252	$30,440,621	$5,629,631
Add rent'ls and interest	8,584,914	6,491,145	2,093,760
Gross income	$44,655,166	$36,931,766	$7,723,400
Less rent'ls and int'r'st	22,460,836	19,654,236	2,806,600
Net income	$22,194,330	$17,277,530	$4,916,800
Sinking fund	512,063	506,031	6,032
Dividend, 6 per cent.	10,857,672	8,781,171	2,076,502
Balance	$10,824,595	$7,990,329	$2,834,266
Extra expenditures	10,824,595	7,990,329	2,834,266
Profit and Loss adjustments:			
Net profit on stock sales, etc.	$10,361,929	$3,957,175	$6,404,754
Less adv. to coal companies, etc.	‡	2,302,149	2,302,149
Extra expenditures	8,536,757	1,550,456	6,986,301
Balance to P. and L.	$1,825,172	$104,570	$1,720,601

‡Not separately reported in 1901, being deducted from net profits in preceding item.

Of the increase in gross earnings reported above about $3,503,000 is accounted for by the fact that the Buffalo & Allegheny Division was operated for only five months in 1900 by Pennsylvania Railroad. Taking the increase in gross, as reported, however, freight traffic accounts for $9,510,000, and passenger traffic for $2,774,000. Maintenance accounts between them absorbed $2,963,000 of the gain in gross and transportation expenses $3,971,000 more.

As in 1900, the Pennsylvania Railroad used up all its surplus income for extraordinary expenditures, these appropriations out of the year's income being no less than $10,857,000 in 1901. This, however, was hardly half of the total appropriations for betterment work, the company taking an additional $8,356,000 out of special profits through stock allotment premiums for extraordinary betterments. Total of all such appropriations, including those on the Western lines, amounted to $21,765,900, which compares with $27,600,000 directly charged against the year's expenses on the Pennsylvania Railroad for maintenance. In fact, the company has carried on the enormous betterment work, of recent years, without making any charge to capital account. Cost of road, equipment and real estate remain without material change for several years past.

The company's capital has been enlarged, however, by its policy of buying heavily into the securities of the soft coal carrying roads, to secure a voice in their traffic policy, by the Long Island purchase, etc. In 1901 these purchases of stocks of other railroad companies increased the company's outstanding stock by $51,770,000 to a total of $203,272,100 on Dec. 31 last.

This policy of purchasing into the securities of the soft coal carrying lines is represented by increase in stocks of other corporations held in the treasury to $166,700,582, against $83,908,675 in 1899, when this expansion began, while bonds owned figure for $36,293,579. This total of $202,994,161 exceeds enormously the total of the company's other capital investments, the aggregate capitalization on account of roadway, real estate, equipment and terminals being $127,124,269. Increase of $37,427,200 in total of securities of other companies owned, follows expansion of $45,275,000 in this account in 1900. As the larger share of the increase in the Pennsylvania's capital stock in recent years has been to secure funds to finance these purchases of shares, the charges in that item of the balance sheet, representing the cost of the securities, and their par value, together with the outstanding capital stock, are shown below:

	Cost of securities owned.	Par value of securities owned.	Outstanding Pennsylvania R. R. shares.
1901	$202,994,161	$298,014,949	$203,272,100
1900	164,965,438	255,059,645	151,502,250
1899	120,362,426	176,254,489	129,305,500
1898	117,238,886	172,672,108	129,305,500

In 1901 security holdings yielded an income of $7,781,720, or over 3¾ per cent. on the cost of the investments. These charges in stock and security holdings are virtually the only ones in the balance sheet showing significant change. The $20,650,000 carried in 1900 as "collateral investment obligations" has been liquidated through proceeds of sale of additional shares. The funded debt increase in 1901 is only $259,787, exclusive of car trusts, which are not carried in the balance sheet. Issues of car trusts in 1901 were $5,271,000 for 1,000 box cars, 1,000 long gondolas, 3,000 steel gondolas, and 1,000 steel flat cars, an aggregate of 6,000 cars. Owing to the exceptional demand for equipment, a new trust, known as the Pennsylvania Steel Car Trust, was created, for building 19,000 additional freight cars for the various lines embraced in the system. Orders for new equipment are not stated. Car trusts, exclusive of the issue last named, are reported at $18,671,000, covering 34,670 cars.

Revenue charges as well as increase of equipment, indicate the extent of the growth of traffic movement in the year. This was 24,331,600 in tons moved, while increase in tons moved one mile on Western lines was 906 millions, and on the Eastern lines 649 millions. Eastern lines gained 19,623,300 in number of passengers and the Western 1,171,500, while increase in passenger miles was respectively 352½ millions and 28¾ millions. Coal and coke tonnage was 37,001,500, and amounted to over a third of the tonnage on the Eastern lines. Details of traffic movement are reported below:

	1901.	1900.	1899.
Tons moved:			
East lines	153,046,281	142,713,713	136,771,314
West lines	90,361,754	73,286,045	73,208,802
All lines	243,408,035	215,999,758	209,980,116
Ton-miles*:			
East lines	14,474,935	13,823,684	12,906,690
West lines	7,454,043	6,360,857	6,707,960
All lines	21,928,978	20,184,541	19,614,650
Passengers carried:			
East lines	82,282,499	62,435,709	57,888,660
West lines	22,188,802	20,051,495	18,754,888
All lines	104,471,301	82,487,204	76,643,548
Passenger-miles*:			
East lines	1,748,187	1,389,135	1,272,385
West lines	620,918	568,179	528,457
All lines	2,369,105	1,957,313	1,800,842

* 000 omitted.

This largely increased traffic has been handled with increasing economy on all divisions. It is not possible to go into details, with the space at our command, but a few of the results on the Eastern lines may be instanced. Excluding the Buffalo & Allegheny Division operated only five months in 1900, tons moved increased 5,413,000, or over 5⅛ per cent. and ton-mileage increased 221 millions, or 1.91 per cent., while freight trains ran 574,700 miles (2.41 per cent.) less. Rates were well held, the average ton-mile rate increasing 7⅔ per cent, to 5.80 mills, having been 4.73 mills in 1899. Ton-mile profit has increased from 1.29 mills in 1899 to 1.77 mills in 1900, and to 2.05 mills last year. Freight train mile earnings have increased from $2.22 three years ago to $2.93 last year. Passenger train and traffic statistics show like results, and altogether the record presented by the Pennsylvania Railroad in every department of operations, is one of great prosperity and enormous resources, which are summed up in wonderfully impressive figures in this report.

The president's remarks present clearly the magnitude of the work going on for the betterment of the Pennsylvania lines, but this notice is already long, and we will simply point out here that, besides summarizing financial changes and general improvements, Mr. Cassatt gives extended explanation of the plans for the North and East River tunnels.

Delaware & Hudson.—The annual report to Dec. 31 appears in much improved form, which leaves little to be desired in the fullness of the information of the company's operations given to the shareholders, particularly, perhaps, as regards the financial accounts, though the report includes certain other tables, the characteristics of the roadway for instance, and details of the equipment account, which are more detailed than is usual. In this policy the company agrees with the new administration of the Lackawanna Railroad, and with the Central of New Jersey. The Lehigh Valley Railroad and the Reading Company have also published elaborate reports since their present managements came into power, and it thus happens that the anthracite carrying railroads now publish some of the most complete annual reports which reach the public, whereas a few

years ago most of them confined their reports to brief summaries covering one or two pages of a letter sheet.

In this report of its 1901 operations, the Delaware & Hudson Company, like all the anthracite coal mining and carrying companies, reports most prosperous conditions. In reviewing its earnings, it is to be remembered that the coal operations are the more important part of the company's business, and that these are carried on directly, without intermediary coal companies, while the larger share of the railroad property is leased line, whose net accounts alone have heretofore been taken into the accounts. Even in the current report only net receipts of the property are carried into the aggregate gross receipts as stated in the report, except in one brief summary, in which gross receipts are reported as $29,497,455. Though this summarized income account gives no details as to its composition, and a different adjustment of accounts is made in the detailed income account, its theory is followed in the compilation below:

	1901.	1900.	Increase.
Coal sales	$16,924,933	$12,286,029	$4,638,904
Railroad gross	12,178,683	11,485,189	693,494
Total gross	$29,103,616	$23,771,218	$5,332,398
Coal expenses	15,517,626	12,163,967	3,353,659
Railroad expenses	6,377,080	6,029,419	347,661
Total expenses	$21,894,706	$18,193,386	$3,701,320
Coal net earnings	1,407,307	122,062	1,285,245
Railroad net earnings	5,801,603	5,455,770	345,833
Total net earnings	$7,208,910	$5,577,832	$1,631,078
Other income	393,838	551,432	*157,594
Total income	$7,602,748	$6,129,264	$1,473,484
Fixed charges	2,998,672	2,941,872	56,800
Net income	$4,604,076	$3,187,392	$1,416,684
Depreciation	1,233,369	1,046,897	186,472
Surplus for dividends	$3,370,707	$2,140,495	$1,230,212
Dividends	†2,450,000	‡1,750,000	700,000
Balance	$920,707	$390,495	$530,212

* Decrease. † 7 per cent. ‡ 5 per cent.

It will be seen from this that not only is 57 per cent. of the company's income derived from sales of coal, but far the largest share of the increased income shown for 1901 is obtained from this source, the increase from large sales of coal being $4,638,000, or over 37½ per cent., and, in fact, nearly 90 per cent. of the total gain in receipts, indeed, $6,200,000 of the $12,179,000 gross receipts credited to the railroads, represents credits to these railroads for the carriage of coal from the mines to market, so that coal revenues of the company in 1901, including sales and transportation accounts, were $22,389,000 out of the total revenue of $29,500,000 recorded.

Anthracite coal production in 1901 ran up to 53,568,601 against 45,107,500 tons in 1900, and of these amounts Delaware and Hudson mines produced 4,667,387 tons last year, as against 4,017,139 the previous year, but in 1901 the total tonnage mined for the company was 5,055,392 tons, the company having in the year acquired the Hudson Coal Company, producing 388,005 tons. Total anthracite transported was 7,571,300 tons in 1901, an increase of 957,296 tons for the year. All tonnage moved was 13,057,958 tons, or 853,651 tons more than in 1900, many classes of traffic showing losses from 1900. Changes in traffic and train movements, figures which the company now reports for the first time, follow:

	1901.	1900.	Increase.
Total tonnage	13,057,958	12,204,307	853,651
Passengers carried	5,703,635	4,952,067	751,568
Tons, 1 mile*	1,274,511	1,152,850	121,661
Passengers, 1 mile	95,835,051	87,064,894	8,770,157
Ton-miles, per mile	1,928,653	1,733,687	194,966
Passenger-miles, per mile	145,022	130,931	14,091
Av'ge freight haul, miles	97.6	94.5	3.1
Av'ge passenger haul, miles	16.8	17.6	*0.8
Pass. train-mile revenue	$1.028	$.965	$.063
Freight train-mile revenue	2.682	2.507	.175
Loaded freight car miles	61,269,232	59,684,742	1,584,490
Freight train miles	3,586,489	3,630,094	*43,605
Av'ge freight train load	355.3	317.5	37.8
Per cent. exp. to earn.	50½	50½	....

* 000 omitted.

The depreciation funds, shown above, are virtually betterment funds, that for 1900, however, having been written off against accumulated surplus and not against the income of the year as in 1901.

In addition to these special appropriations reported above, President Olyphant calls attention to the large improvements carried out during the year and charged against current operating expenses in both the coal and railroad departments. He particularizes extraordinary expenses on the railroads of $488,354 and in the coal department of $574,563, which, together with the betterment charges and sinking fund itemized before, and $74,045 for other depreciations, brings the total extraordinary charges against the year's income up to $2,370,321, a figure which closely approximates the amount distributable to the shareholders under the 7 per cent. dividend rate, established for 1901, and continued for the current year. Mr. Olyphant also points out that many of these betterments are of a character that should bring about a lower percentage of operating expenses for the current fiscal year. Even in 1901 these economies are apparent in the details now given for the first time of the company's operations, particularly in the slight increase in conducting transportation expenses, despite the enlarged volume of traffic and in the traffic and mileage statistics, where the better operating results following reduction of grades and curves and the installation of larger cars and engines of greater hauling capacity are evident.

Improvement in the company's physical condition and the consequent decrease in the cost of transportation are being made virtually without the enlargement of the capital account. Thus in 1901, as reported above, depreciation and sinking funds amounted to $1,233,400, while new capital charges on all accounts were $1,718,100 net, including $953,000 for new equipment, $267,000 for new branch road, and $70,000 for real estate and coal lands. Besides the replacement of old cars by new equipment, there were added net 2,285 cars (including mine equipment) together with 28 motors and locomotives, and virtually all the equipment on the railroad and at the coal mines is new.

January Accidents.

We publish in another column of this issue a condensed record of the principal train accidents which occurred in the United States in the month of January. The record contains accounts of 50 collisions, 12 derailments and 2 other accidents. Those which were most serious or are of special interest by reason of their causes or attending circumstances occurred as follows:

3d—New Florence, Pa.
7th—Alnwick, W. Va.
8th—New York City.
18th—Victor, Iowa.
26th—Keller, Texas.
30th—Deerfield, Ill.

The only accident in which passengers were killed in a passenger train was that at New York city, on Jan. 8. This collision has already been made familiar to our readers. Another chapter in its history will have to be written when the subject comes before the Grand Jury in New York city. The collision near New Florence, Pa., killing four employees, is a striking example of "failure in block working." It is, of course, quite different from the New York city collision, in that the latter was due to no fault of the signalman or signal apparatus. At New Florence there is no electric locking of any kind. Errors of this class are now common enough to be noticeable; and as the block system is now in use on many thousand miles of road, they may be expected to continue to occur now and then, unless we adopt automatic signaling, or lock-and-block, or improve our discipline.

The derailment at Glencoe, Pa., on the 1st was a serious disaster, though no passengers were killed outright. Still another passenger train wreck in which the cars were all ditched was that at Coopersburg, Pa., on the 22nd. This resulted very fortunately, none of the passengers being badly hurt. Victor (Iowa) is another case where the escape of the passengers was remarkable.

The worst freight train accidents in the present record were those at Bridgewater, N. H., Rex, Ga., and Vienna, W. Va. In the last-named case it is said that the engineman was helping the fireman, either because the latter was inexperienced or because he was exhausted. Whatever the reason for helping the fireman, the circumstance does not, of course, afford any excuse for not remembering an order or for not seeing a station when it was passed.

A car in a passenger train of the Mexican National was crushed by a rock which fell from a ledge overhanging the track, and six passengers were killed. This was reported in a press despatch from Monterey, Jan. 18.

The number of electric-car accidents reported in the newspapers, as occurring in the United States, in January, was 18, in which six persons were killed and 34 were injured. In seven of these accidents a street car was run into by a locomotive or by a freight train, and five of the accidents were runaways. At Wilmerding, Pa., on the 28th, two cars ran away on the same hill within a few minutes of each other, and five persons were killed.

The Chicago & North Western has given notice that it will withdraw from the freight associations and committees of which it is now a member, and the reporters believe that the reason for this action is an expectation that the United States Government will soon proceed against all traffic associations as violators of the Anti-Trust law. This belief appears to be founded mostly on guesses, however, as does the other report, also from Chicago, that President Roosevelt, or the Interstate Commerce Commission, acting at the President's suggestion, has warned the railroads that the law forbidding rate cutting is to be vigorously enforced. This story includes a prediction that all of the traffic committees and associations in the West are to be dissolved very soon. At the same time it is reported that the Western traffic officers who a few months ago promised to give the Interstate Commerce Commission a statement of the rebates that their roads have paid to heavy shippers, are not going to fulfil their promises. Here, again, the information is vague and cannot be regarded as worth notice until particulars are given. Not to be deficient in variety the Chicago despatches also state that some of the roads to the East are again paying rebates on packing house products. A report which is apparently more definite and authentic is that from Washington, last Tuesday, saying that the Attorney-General, as soon as he "gets over the rush" of preparing his case against the Northern Securities Company, will apply for injunctions against the principal rate-cutting railroads, to see if their unlawful practices cannot be stopped in this way. A New York paper says that the President has talked with Senator Depew, President Hill, of the Great Northern; President Hughitt, of the Northwestern; President Felton, of the Chicago & Alton, and President Ripley, of the Atchison, and has reached the conclusion that the only way to get needed amendments of the Interstate Commerce law is to enforce the law until Congress passes a law allowing pools and traffic agreements.

NEW PUBLICATIONS.

Iron and Steel Works in 1902.—The fifteenth edition of the Directory to the Iron and Steel Works of the United States presents a thoroughly revised description of all the blast furnaces, rolling mills, steel works, and tinplate works in the United States; also of the few remaining forges and bloomaries. The iron and steel works of Canada are also described. The Directory is complete in all essential details down to the close of 1901. The present edition of the Directory is divided into four parts, as follows:

Part I is chiefly devoted to the presentation of a list of the consolidations and reorganizations that have taken place in the American iron trade during the last few years, with an account of their capitalization and of the properties absorbed by them, mentioning also the names of previous owners of the properties. The names of directors, executive committees, and other officers are given.

Part II, occupying 164 pages, embodies a description of all iron and steel works in the United States that are not described in Part I. The arrangement is by States and districts.

Part III occupies 71 pages and is devoted to the classification by States of the iron and steel works of the whole country (except blast furnaces) according to their products.

Part IV occupies 13 pages. While Parts I, II and III were passing through the press in the late months of 1901 changes were taking place in the officers of many of the companies whose works are described in its pages and some new enterprises noted in the Directory as having been undertaken were completed. All these and some other changes which had taken place prior to Dec. 31, 1901, are noted in this part of the Directory, so that the whole book may be regarded as complete down to the date mentioned.

This edition of the Directory also contains a complete account of the iron and steel enterprises in the Dominion of Canada which had been completed or undertaken down to Dec. 31, 1901, occupying eight pages. The names of officers, descriptions of plants, etc., are given in full detail, with proper geographical classification in each case. We have not thought it necessary in this edition to consider the iron and steel works of Mexico. We know of only one addition to the list of iron and steel enterprises of that country as it was given in the Directory for 1898, and this enterprise is not yet in operation.

It will be seen that the arrangement of the new Directory differs in some material respects from that of its predecessors, but the innovations have all been rendered necessary by the radical changes that have taken place in the iron trade itself. All the essential descriptive features of previous editions have been retained.

There remain less than 400 live furnaces to-day. But many of these are the largest that the world has ever seen. Their annual capacity in round numbers is 24,000,000 gross tons, an increase since 1898 of 33⅓ per cent. Our actual production of pig iron in 1901 was 15,878,354 gross tons. The annual production of charcoal pig iron is not decreasing, although it is decreasing relatively as compared with the production of pig iron with coke and other fuels. The average annual capacity of the 79 charcoal furnaces in 1898 was 12,119 gross tons, and the average annual capacity of the 55 charcoal and five mixed charcoal and coke furnaces that are now described is 14,179 tons. The average annual capacity of the mineral fuel furnaces in 1898 was 53,150 tons, and the average annual capacity of these furnaces to-day is 69,252 tons.

In the present edition are enumerated 527 completed rolling mills and steel works, 28 in course of erection, and one being rebuilt, making a total of 556. In addition the Directory mentions one plant which is to be rebuilt and six plants that are projected.

The total number of completed Bessemer steel works in April, 1898, including two Clapp-Griffiths plants and one Robert-Bessemer plant, was 45, and the whole number of converters was 100. In November, 1901, there were 35 standard Bessemer steel works with 81 converters, one Clapp-Griffiths plant with one converter, two Robert-Bessemer plants with three converters, and nine Tropenas and "special" Bessemer steel plants with 15 converters; total number of Bessemer plants, 47; total number of converters, 100, the same number as in 1898. The increase in the number of small Bessemer plants in the last few years is noteworthy. Since April, 1898, seven standard Bessemer plants have been placed on the retired list, but the capacity of the remaining standard plants has been increased. The annual capacity of the completed Bessemer converters in April, 1898, was 10,633,000 gross tons; in November, 1901, the capacity of the built and building converters was 12,998,700 tons.

In the Directory for 1898 were described 99 completed open-hearth steel plants, with 281 completed furnaces, and in the present Directory are described 112 completed plants, with 403 completed furnaces. In 1898 no new plants were being built. In November, 1901, 12 open-hearth plants with 40 furnaces were building, one plant was to be rebuilt, 13 plants were projected, and six furnaces were being added to existing plants. The annual capacity of the 403 completed and the 46 building open-hearth furnaces, in ingots and direct castings, in November, 1901, was 8,289,750 gross tons, against 3,522,250 tons of the completed furnaces in 1898.

In the present Directory 167 open-hearth furnaces are described as making acid steel and 236 as making basic

steel; total, 403 furnaces. The acid furnaces have an annual capacity of 1,874,650 gross tons of ingots and castings, and the basic furnaces of 6,415,100 tons.

The whole number of works which are now equipped to manufacture all kinds of rolled structural material is 67. This branch of the American iron trade, like the production of steel castings, has made marvelous progress since the appearance of our last Directory. It has been a leading factor in the development of our open-hearth steel industry and in the enlargement of our Bessemer steel industry beyond the production of rails.

This invaluable Directory may be had from Mr. James M. Swank, 261 South Fourth street, Philadelphia, Pa. The price is $10.

A Treatise on the Locomotive and Air Brake. Vol. II. Prepared for students of the International Correspondence Schools, Scranton, Pa. Octavo, 846 pages; 269 illustrations and 20 color plates; index. Scranton, Pa.: The International Text Book Co.

This work is really several volumes in one, as is indicated by the table of contents, which includes sections given to locomotive boilers, steam cylinders and valve gears, locomotive management, breakdowns, compound locomotives, train rules, car lighting, car heating and the electric headlight. At the end are numerous practical examination questions on the ground covered. The book is profusely illustrated with line drawings, many of them double page. In addition there are a number of colored plates, illustrating the conditions existing in the cylinders of different types of compound locomotives during the events of the stroke, and which give a clear understanding of the conditions. The more important sections have introductory chapters explaining, in simple language, the scientific principles involved in the questions to be discussed in these sections.

The part on breakdowns goes into the matter in detail, describing the breakdowns likely to occur to each particular type of locomotive and the methods of dealing with them, illustrations being shown wherever necessary to make the directions perfectly clear.

The book is exclusively for students of the International Correspondence Schools and was prepared by the Schools' instructors. The whole work was revised by Mr. C. B. Conger and Mr. W. O. Thompson, which will carry much weight with enginemen and firemen. It is the best book of the kind we have seen.

Train Accidents in the United States in January.‡

NOTE.—*An asterisk at the beginning of a paragraph indicates a wreck wholly or partly destroyed by fire; a dagger indicates an accident causing the death of one or more passengers.*

*xc, 1st, 4 a.m., Keithville, La., collision between trains of the Texas & Pacific and the Houston East & West Texas; 12 cars wrecked and destroyed by fire. The fireman of the H. E. & W. T. train was killed.

xc, 1st, Boston & Albany, Adams, Mass., in a collision which occurred during the switching of freight cars a brakeman was killed.

*1st, Baltimore & Ohio, Glencoe, Pa., a passenger train was derailed and the engine was overturned. Six cars were ditched, and the wreckage took fire from the locomotive. One sleeping car, one observation car, two passenger cars, one baggage car and one postal car were burned up. The engineman and fireman were killed, and two postal clerks and 15 passengers were injured. This accident occurred on a descending grade, but the cause has not been determined. One account says that the train was derailed in consequence of running too fast.

*xc, 2nd, Boston & Maine, Bridgewater, N. H., a freight train, drawn by two engines, collided with a gravel train on a long wooden bridge, damaging all three of the locomotives. The bridge took fire from the wrecked engines and, with the engines and several cars, was burnt down and fell to the ice of the river below. It appears that the flagman of the gravel train did not go far enough to signal the freight and the freight was running too fast. The engineman of the gravel train was fatally injured.

rc, 3rd, 10 p.m., Pennsylvania road, between Sheridan and New Florence, Pa., eastbound first class train No. 14, third section, ran into the rear of a preceding freight train, damaging the engine and several cars. A part of the wreck fell on the westbound track and was run into by a westbound freight, running at good speed down grade. The westbound engine and five cars fell down a bank into the Conemaugh River. Four trainmen were killed and four injured. The collision was due to the mistake of the signalman at Nineveh in giving a clear signal to train No. 14, when he should have given a caution signal. There were no passengers in train 14.

bc, 5th, Choctaw, Oklahoma & Gulf, Earlsboro, Ind. T., butting collision of freight trains, wrecking both engines and several cars. Three trespassers, riding on the train, were killed. It is said that the eastbound train disregarded an order directing it to wait for the westbound at Earlsboro.

*bc, 5th, Southern Railway, Rex, Ga., butting collision of freight trains, wrecking both engines and many cars. The wreck was destroyed by fire. Three trainmen were killed.

rc, 6th, 6 a.m., Yazoo & Mississippi Valley, Vicksburg, Miss., passenger train No. 26 collided with a switching engine, making a bad wreck. The passenger engineman was killed.

bc, 6th, Cincinnati, Hamilton & Dayton, Tippecanoe City, Ind., butting collision between a freight train and a train consisting of an engine and a caboose, wrecking both engines and seven cars. Six trainmen were injured.

xc, 6th, St. Louis Southwestern, Texarkana, Texas, collision between a freight train and a train of empty passenger cars, wrecking one engine and four freight cars. One engineman was killed, and a fireman injured.

*bc, 7th, 5 a.m., Norfolk & Western, Alnwick, W. Va., butting collision between passenger train No. 4 and a freight train, wrecking both engines, several freight cars and three baggage cars. Three trainmen were killed. The wreck took fire and was mostly burnt up. Flagman Turner, of the freight, had been sent out to stop the passenger train, but he failed to get the engineman's attention, and in his efforts to make his signals seen he was run over and killed. As both the passenger engineman and the freight flagman were killed it has been found impossible to even form a theory as to how the signal came to be overlooked. The flagman had almost reached a telegraph station, and his lantern had been seen by the operator at the station.

xc, 7th, 6 a.m., Frascati, Ala., a passenger train of the Louisville & Nashville ran into a freight of the Mobile, Jackson & Kansas City, at the crossing of the two roads, wrecking a car of lumber. A brakeman of the freight was killed and one other employee was injured.

xc, 7th, Western Maryland, Culbertson, Pa., collision between a freight of the Reading road and one of the Western Maryland. The Reading engine fell down a bank and the fireman and two other trainmen were injured.

xc, 7th, Pennsylvania Lines, Erie, Pa., collision between two empty engines, damaging both. Four employees riding on the engine were injured, three of them being badly scalded.

†rc, 8th, 8 a.m., New York Central & Hudson River, Fourth avenue and Fifty-sixth street, New York City, a southbound passenger train of the New York, New Haven & Hartford, which had been stopped in consequence of the presence of another train ahead of it, but had been started and had moved forward a few feet, was run into at the rear by a following passenger train of the New York Central, crushing the rear car and badly damaging the car next forward. Fifteen passengers were killed, all of them in the rear car; and 40 were injured, two of them fatally. The Central train had run past a home and a distant signal set against it. This collision was reported in the *Railroad Gazette* of Jan. 10, 17, 24 and 31, and Feb. 7 and 14.

xc, 8th, Wabash road, Lagro, Ind., eastbound passenger train No. 2 ran into a freight which was entering a sidetrack, and the passenger engine and four freight cars were wrecked. One fireman was injured.

xc, 8th, Rio Grande Western, Roy, Utah, butting collision between a freight train and a work train, wrecking six cars. A fireman was killed and three other trainmen injured, one of them fatally. There was a dense fog at the time.

xc, 8th, Baltimore & Ohio, Shinnston, W. Va., a passenger train ran over a misplaced switch and into a freight train standing on a side track; three passengers injured.

bc, 9th, Yazoo & Mississippi Valley, Frellsers, La., butting collision of freight trains, damaging both engines. There was a dense fog at the time. The fireman of the freight was killed and four other trainmen were injured.

xc, 9th, Pittsburgh, Fort Wayne & Chicago, Allegheny, Pa., collision between a passenger train and a yard train, badly damaging both engines; two passengers and three trainmen were injured.

unx, 11th, 7 p.m., Central of Georgia, Carrollton, Ga., one truck of a car in a freight was derailed, and not being discovered by the trainmen it ran about two miles on the sleepers, when, at a street crossing, the wheels again ran on to the track.

rc, 12th, Pittsburgh, Fort Wayne & Chicago, at Fifty-first street, Chicago, passenger train No. 21 ran into the rear of a preceding passenger train, damaging the engine and wrecking a dining car. Two trainmen were injured.

*bc, 12th, 3 a.m., Southern Railway, Reeves, Ga., butting collision between a passenger train and a freight, wrecking both engines and 12 cars. The wreck took fire and was mostly burned up. One engineman was killed and three other trainmen and two passengers were injured. The northbound train should have waited at Reeves for the southbound; but it is said that another freight train, standing on the side track, was mistakenly assumed to be the one which was to be met.

rc, 13th, Pittsburgh, Fort Wayne & Chicago, Valparaiso, Ind., a freight train which had been unexpectedly stopped was run into at the rear by a following passenger train; engine, caboose and four freight cars damaged. Three trainmen injured. There was a blinding snowstorm at the time.

xc, 13th, 6 a.m., Chicago, Rock Island & Pacific, O'Keene, Okla. T., collision between a freight train and a work train, due to a misplaced switch, which, it is believed, had been tampered with. Two employees, sleeping in the work train, were killed and eight were injured.

xc, 14th, 6 a.m., Louisville & Nashville, South Louisville, Ky., collision between a train carrying employees and a freight train, overturning one engine and wrecking three cars. One employee was killed and two were injured.

dn, 15th, Southern Pacific, Tulane, Texas, a freight train was derailed at a switch and several cars fell against a work train standing on a side track, killing two employees on the work train. It is said that the switch had been left unfastened.

o, 15th, Baltimore & Ohio, Connellsville, Pa., a locomotive was wrecked by the explosion of its boiler; three trainmen injured.

unx, 17th, Southern Pacific, Lafayette, La., passenger train No. 9 was derailed and five passenger cars were badly damaged; three passengers were injured.

unx, 18th, Southern Railway, Hazlehurst, Ga., a passenger train was derailed and three cars were badly damaged. Several passengers were injured.

o, 18th, Chicago, Rock Island & Pacific, Victor, Iowa, the engine of passenger train No. 5 was wrecked by the explosion of its boiler. The engineman and fireman were killed, and three trainmen were injured. The train was running at full speed; all of the cars in the train were derailed and one sleeping car was overturned, but the passengers escaped with very slight injuries.

*rc, 19th, 4 a.m., Pennsylvania road, Portage, Pa., a freight train descending a steep grade ran into a preceding empty engine, which was moving slowly, and both together ran into the rear of another freight train which had stopped. Two engines, two cabooses, and one freight car were damaged, and the wreck was mostly burned up. One brakeman was killed and one injured.

bc, 19th, 1 a.m., Missouri Pacific, Etlah, Mo., butting collision between a westbound passenger train and an eastbound freight, wrecking both engines and four freight cars. The passenger cars were damaged, but only a few passengers were slightly injured. The freight train had run past the point where it should have waited for the passenger, this being due, it is said, to the fact that the engineman had fallen asleep. He awoke, however, just after passing the station, and stopped his train, and ran forward on foot in the attempt to flag the passenger train.

bc, 19th, 5 a.m., Baltimore & Ohio, Vienna, W. Va., butting collision of freight trains, wrecking both engines and three cars. One engineman and one fireman were killed; two brakemen injured. Engineman, who was killed, neglected an order to wait for the other train at Vienna.

xc, 19th, Pennsylvania road, Renovo, Pa., collision between a freight train and an empty engine; four trainmen injured.

*bc, 20th, Atchison, Topeka & Santa Fe, Medway, Kan., butting collision between passenger trains Nos. 6 and 7, badly damaging both engines and five cars. The wreck took fire and was mostly burnt up. The westbound train, No. 7, should have entered the side track, but passed the switch at uncontrollable speed and struck No. 6 at the station. There was a blinding snowstorm at the time.

bc, 21st, Ohio Central, Granville, Ohio, butting collision between passenger train No. 5 and an empty engine, wrecking both engines.

xc, 20th, Pittsburgh, Fort Wayne & Chicago, New Galilee, Pa., collision between two freight trains, pulling out of side tracks, both moving in the same general direction, derailing and damaging ten cars. A brakeman was killed and two other trainmen were injured.

xc, 21st, Pennsylvania road, Madley, Pa., a freight train, descending a grade, broke in two and the rear portion afterward ran into the forward one, wrecking 12 cars.

*rc, 22nd, Illinois Central, Kuttawa, Ky., passenger train No. 104 collided with a freight train which was entering a side track. A caboose and one freight car were wrecked and destroyed by fire. One engineman jumped off and was injured.

eq., 22nd, 7 p.m., Philadelphia & Reading, Coopersburg, Pa., a passenger train, running at good speed, was derailed by the breaking of one of the trucks of the tender, and the whole train ran some distance on the sleepers, the cars finally being overturned. The passengers and trainmen all escaped with slight injuries.

bc, 23rd, St. Louis, Iron Mountain & Southern, Mill Springs, Mo., butting collision of freight trains, wrecking both engines and several cars. Two trainmen were killed and another fatally injured. It is said that a brakeman, sent out from the northbound train to flag the southbound, misunderstood his orders and allowed the train to pass him.

bc, 23rd, New York Central & Hudson River, Jersey Shore Junction, Pa., southbound passenger train No. 7 collided with a northbound freight train which had just started from the station, badly damaging both engines. One engineman was injured. The engineman of the freight had discovered that he was encroaching on the time of the passenger train and had started to set back into the side track.

bc, 24th, 5 a. m., Burlington & Missouri River, Omaha, Neb., collision of switching freight trains. One trainman killed and five injured. There was a dense fog at the time.

dr, 24th, Chicago & Alton, Mexico, Mo., a freight train was derailed by a broken rail and several cars, including one occupied by passengers, were ditched. Nine passengers and one trainman were injured.

*dn, 24th, Denver & Rio Grande, Pando, Col., a freight train, descending a steep grade, became uncontrollable and the engine and 12 cars were derailed and wrecked. The wreck took fire and was mostly burnt up. The fireman was killed and three other trainmen were injured, one of them fatally.

*bc, 25th, Southern Pacific, San Luis Obispo, Cal., butting collision between a freight train and a work train, in tunnel No. 2, near one end. Three engines and several cars were wrecked. The wreck was partly destroyed by fire. One fireman was killed and two other trainmen were injured. It is said that the flagman of the work train failed to carry out his instructions in regard to stopping the freight.

eq., 25th, Wabash road, Keeport, Ind., the locomotive of a passenger train was damaged by the breaking of a side rod, and the engineman was injured. The front truck of the tender was derailed.

*†rc, 26th, 3 a. m., Missouri, Kansas & Texas, Keller, Tex., rear collision of freight trains, wrecking a caboose and one car. The caboose took fire and was burnt up. A drover was killed and another injured. There was a dense fog at the time.

bc, 28th, 4 a. m., Southern Pacific, Raceland, La., an eastbound freight train, standing at the station, was run into by a westbound freight which approached it at uncontrollable speed, damaging both engines. Both firemen were injured. There was a dense fog at the time.

*rc, 28th, New York Central & Hudson River, Oak Grove, Pa., a freight train which had stopped on account of a broken coupling was run into at the rear by a following freight; and the caboose, two coal cars and locomotive were wrecked, the engine being overturned. The caboose was destroyed by fire.

xc, 28th, 6 a. m., Baltimore & Ohio, Pine Grove, Pa., collision of freight trains, wrecking two engines and 20 cars. Five trainmen were injured.

xc, 28th, New York Central & Hudson River, Oneida, N. Y., an eastbound passenger train collided with a switching engine and both engines were wrecked. The switching engine broke through the wall of the station, and the passenger engine was overturned on tracks 2 and 3. The passenger engineman was killed. The coroner found the collision due to negligence of yardmen, who fouled the main track without permission from the block signalman, and he censured the road for retaining in its employ men who persistently and continuously violated the rule forbidding this.

dn, 28th, Yazoo & Mississippi Valley, Glendale, Miss., a switching freight train became uncontrollable on the incline approaching the Mississippi River and three cars fell into the river. A brakeman was drowned.

xc, 29th, Pennsylvania road, Newcastle, Pa., a passenger train collided with a switching engine, badly damaging both engines. Three trainmen were injured.

xc, 29th, Virginia & Southwestern, Bristol, Va., a freight train ran over a misplaced switch and collided with four engines standing on a side track. Two of the engines were wrecked and the other three damaged.

29th, Southern Pacific, Livermore, Cal., a train consisting of an engine and a caboose (the caboose in front) was derailed, apparently by running too fast on a poor track; and the caboose, engine and tender were overturned. The trainmaster and the conductor, riding in the caboose, were injured.

†rc, 30th, Chicago, Milwaukee & St. Paul, Deerfield, Ill., a freight train, standing at a water tank, was run into at the rear by a following freight. A drover was killed and three trainmen were injured.

bc, 30th, 6 a. m., Southern Railway, Anniston, Ala.,

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‡Accidents in which injuries are few or slight and the money loss is apparently small, will as a rule be omitted from this list. The tabular statement of totals will be omitted entirely, as a more complete report of the total number of accidents is to be published by the Interstate Commerce Commission. The separation of the classes is abandoned, but the classification will be indicated by the use of the following

ABBREVIATIONS.

rc	Rear collisions.
bc	Butting collisions.
xc	Miscellaneous collisions.
dr	Derailments; defect of roadway.
eq	Derailments; defect of equipment.
dn	Derailments; negligence in operating.
unf	Derailments; unforeseen obstruction.
unx	Derailments; unexplained.
o	Miscellaneous accidents.

butting collision of freight trains, making a bad wreck. Two trainmen were killed and four injured.

bc, 30th, Cincinnati, Richmond & Muncie, Richmond, Ind., butting collision between a passenger train and a freight, on a high trestle bridge. The freight conductor was slightly injured.

bc, 30th, Rio Grande Western, Cisco, Utah, butting collision of freight trains; three trainmen killed.

xc, 30th, Yazoo & Mississippi Valley, Vicksburg, Miss., collision of freight trains. One engineman fatally injured.

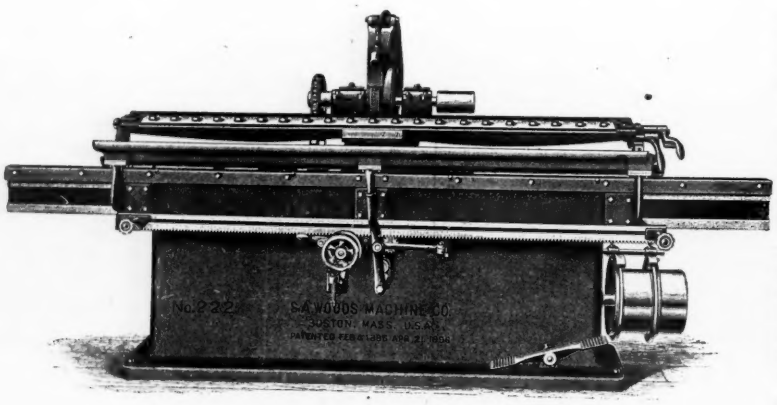
xc, 31st, 9 p. m., New York Central & Hudson River, Syracuse, N. Y., a parcels express train collided with a switching engine and both engines and two cars were damaged. Eight persons were injured.

dn, 31st, Chicago & Alton, Pontiac, Ill., a southbound express was derailed at the derailing switch at the approach to a crossing and three cars fell on their sides. One trainman and four passengers were injured. The derail had been disconnected from the cabin without the signalman's knowledge.

A New Automatic Knife Grinder.

The S. A. Woods Machine Company, South Boston, Mass., has recently put on the market a new automatic knife grinder, No. 222, which is here illustrated. The machine will grind a straight knife up to 120 in. long and is particularly suited for grinding veneer knives to cut lumber and for grinding paper and pulp knives. The machine is in general somewhat like the No. 221 grinder, but has some special new features, is larger and covers a wider range of work.

The No. 222 machine is entirely self-contained and is suitable for wet or dry grinding. It has a graduated index which can be set to grind to one two-thousandth of an inch, and the machine, after being set, takes care of itself in operation. The improved clamping device



A New Automatic Knife Grinder.

grips the knife bar at both ends by a single movement and the bar is supported at four points.

The carriage, which has a reciprocating movement, regulated by stops, which can be set at any point, is stopped or started by the upright lever shown in the illustration. By a patented arrangement the carriage bed is made dust proof. A specially designed automatic pump supplies a steady feed of water, and an adjustable hood prevents water from being thrown off by the wheel. Water is conducted back to a tank at the base of the machine, by suitable channels. Any bevel can be ground either toward or from the edge of the knife, and the graduations on the knife bar, used with the gages which are supplied, make duplication of any bevel easy, as the knife bar is fitted to receive the gages.

TECHNICAL.

Manufacturing and Business.

John S. Small, formerly with the Link Belt Machinery Co., Chicago, has accepted a position with McCord & Co., with headquarters in the Old Colony Bldg., Chicago.

J. L. Mallory, General Manager of the Chicago Grain Door Co., Monadnock Block, Chicago, reports a large demand for that company's doors. Among the orders recently received was one from the Atchison, Topeka & Santa Fe for grain doors for 2,500 cars.

Messrs. John Martin & Co., Pacific Coast representatives of the Stanley Electric Mfg. Company, of Pittsfield, Mass., have opened an office in the Douglas Building, Third and Spring streets, Los Angeles. They already have offices at San Francisco and Seattle, Wash.

J. E. Leith, whose resignation as General Freight and Passenger Agent of the Texas Midland was noted last week, will engage in the manufacture of a metallic paint in St. Louis. The paint is for the front end of locomotives, smokestacks, boiler fronts, bridges, structural iron, etc.

Application to the Governor General for incorporation has been made by the Tretheway Train Pipes-Coupling Company, of Montreal, with a subscribed capital stock of $500,000. The first directors are: Wm. G. Tretheway, Vancouver, B. C.; Thomas A. Trenholme and Geo. F. O'Halloran.

The Hicks Locomotive & Car Works, Chicago, reports the following sales: To the Choctaw, Oklahoma & Gulf, one 50-ton freight locomotive; to the Stearns Salt & Lumber Co., Manistee, Mich., one 35-ton freight locomotive; to the Brooks-Scanlan Lumber Co., Minneapolis, Minn., 15 flat cars of 60,000 lbs. capacity; and to the Bellingham Bay & British Columbia R. R., one 63-ton compound consolidation locomotive.

The Texas Southern Construction Company filed charter at Austin, Tex., Feb. 24, with capital stock of $50,000 and principal office at Sweetwater, Tex. It is formed to do railroad construction work and announcement is made that the company has the sub-contract for the Texas Division of the Kansas City, Mexico & Orient from the Red River to Sweetwater. The incorporators are: C. N. Atkinson, F. C. Allen and E. H. Holcomb, all of Sweetwater, Tex.

The Clayton Air Compressor Works advises us that they have not sold out and gone out of business as reported. No changes have been made that will in any way alter their business relations with their customers. With new capital they are enlarging their works, increasing patterns, sizes and styles and expect to serve their customers better than in the past, and to give them an advantage in the way of prices on improved machinery and new designs.

The Franklin Mfg. Co., Franklin, Pa., maker of the Monarch brand of locomotive lagging, has acquired from the Keasbey & Mattison Co., of Ambler, Pa., the exclusive right to sell in the United States, Canada, Mexico, South and Central America, that company's "85 per cent. pure" carbonate magnesia sectional locomotive lagging. In its contract with the Keasbey & Mattison Co., the Franklin Mfg. Co. has expressly provided that this magnesia lagging shall at all times equal in character the product as sold by the Keasbey & Mattison Co.

Iron and Steel.

Percival Roberts, Jr., has resigned as a member of the Executive Committee of the American Bridge Co.

At a meeting of the Eastern Bar Iron Association, held in New York city last Friday, it was decided to advance prices $2 per ton.

A despatch from Milwaukee announces that the Allis Co. has a $1,632,500 contract for engines for the New York Rapid Transit Railroad.

The directors of the Dominion Iron & Steel Co. have decided to issue $10,000,000 new stock for improvements to the steel works at Sydney, Cape Breton.

The Kidd Bros. & Burgher Steel Co. will change the name of the concern to the Vulcan Crucible Steel Co. The organization of the company remains unchanged. A new plant is being built at Aliquippa, Pa.

The Standard Steel Co. has been incorporated in New York with $125,000 capital. It proposes to make and sell all kinds of steel products. The incorporators are: W. K. McGinness, E. H. Butts and F. A. Yaeger.

Mr. W. F. Bonnell, of Cleveland, Ohio, has been sent to Europe as representative of the independent sheet steel makers of Pittsburgh, to buy 40,000 tons of billets and bars to be delivered in Pittsburgh during the next six months.

According to the annual report of the Empire Steel Co., issued last week, the production of the furnaces for the year ending Dec. 31, 1901, was 185,990 tons of pig iron. The company has acquired all the outstanding stock of the Crane Iron Works.

The Iroquois Machine Co., of Bedford, Westchester County, N. Y., has been incorporated in New York, with a capital of $650,000. The Directors are: W. W. Gibbs and Frederick P. Warfield, of New York City; Edwin A. Smith and H. C. Babcock, of Providence, R. I., and Ogden Brewer, of Montclair, N. J.

The Last Rail Made at Scranton.

The South Mill of the Lackawanna Iron & Steel Co. was closed last week preparatory to dismantling the plant and removal of the last machinery to the new works at Buffalo, N. Y. The last rail rolled was a 30-ft., 60-lb. steel and was cut up into souvenirs. The work of removing the machinery has already been begun. This mill in the 18 years of its operation, is said to have rolled 3,720,000 tons of rails.

Big Rail Output in February.

Notwithstanding several small accidents the Edgar Thomson Steel Works at Braddock during the month of February turned out about 50,000 tons of rails, almost 10,000 tons more than during February, 1901. The third week was the heaviest with nearly 15,000 tons.

Tunnel Ventilation.

The Saccardo tunnel ventilating system is to be established in the Mont Cenis tunnel, at a cost of about $70,000. This Italian invention, first used between Bologna and Florence, is now in use on the St. Gothard, in both of the Giovi tunnels north of Genoa, and between Savona and Turin.

River and Harbor Appropriations.

The list of appropriations for rivers and harbors has been made up. The total carried by the completed measure is $60,700,000. Of this, $24,000,000 is in cash and $36,700,000 is in continuing contracts available July 1, 1903. The total is about $2,000,000 more than proposed in the bill which failed to pass last year. We will give the important items when the bill passes.

Railway Steel Spring Company.

The organization of the new Railway Steel Spring Co., outlined in the *Railroad Gazette*, Feb. 14, p. 118, has been completed by the election of the following directors: Aaron French, Samuel R. Callaway, Julius E. French, Charles H. Halcomb, Truman H. Newberry, Charles Scott, Charles Scott, Jr., Frank S. Layng, George B. Sloan, Jr., Frank B. Smith and S. L. Schoonmaker. The officers are: Chairman of Board, Aaron French; President, J. E. French; Vice-Presidents, Frank S. Layng, Charles Scott, Jr., and George B. Sloan, Jr.; Assistant Treasurer, Frank Carnahan; Secretary, M. B. Parker; General Superintendent, De Witt Loomis; General Counsel, Reed, Simpson, Thacher & Barnum. The Executive Committee is composed of Julius E. French, Truman H. Newberry, and Frank B. Smith.

The Simplon Tunnel.

The progress of the Simplon Tunnel in the month of January last was 680 ft. at the north end and only 6½ ft. at the south end, where the water vein is opened and only hand drilling was possible. The discharge is at the rate of 700,000 gals. per hour. The total penetration at the end of the mouth was 21,436 ft. at the north end and 14,486 ft. at the south end—a little less than seven miles in all. The tunnel has developed a new trouble. On the north end, where work had been unobstructed heretofore, about 3¾ miles from the entrance, the tunnel has reached an elastic and porous rock, consisting mostly of mica slate, which is so brittle that the roof and sides must be supported, and the pressure is so great that the timbers used were often crushed and now a framework chiefly of iron must be used.

German Locomotives for Export.

The German locomotive works are rejoicing in the receipt of a number of foreign orders. The exceptionally large orders of the State Railroads were not sufficient to keep them busy. Maffei, in Munich, is to build 20 for France; the Saxony Co. has an order from Cape Colony; the Hanover Works builds some for India and some for Spain. Italy has given a large order to German works, a large part going to Borsig, in Berlin. Very low bids were made to secure these orders. The Munich works builds for about $2,500 less than the French locomotive works bid.

Bids for an Austrian Tunnel.

Bids are asked for the construction of the Wochein Tunnel, 20,610 ft. long, under the Wochein mountain just south of the headwaters of the Save, and about 75 miles north of Trieste. This is one of the three long tunnels on the line which Austria is to build to shorten the distance from Western Austria to Trieste. The tunnel is to be for a double track, and the contract is to include also 6,530 ft. of the approaches at the two ends. The bidder must give $200,000 security and finish the work by Feb. 1, 1905.

Oil Fuel for Heating Bars and Rivets.

The Indiana Bridge Company, Muncie, Ind., formerly used natural gas for rivet and bar heating furnaces, the sizes of iron ranging from ⅝ to 2¼ in. in diam. But the gas pressure weakened so much in that part of Indiana that it was necessary to substitute some other fuel. Coal could not be used satisfactorily for the purpose and fuel oil was available at wells within three or four miles of the bridge works. A satisfactory mixer and burner was found and the company is now using two furnaces, fired by an air-jet oil spray. Mr. C. M. Kimbrough, President and General Manager of the company, says metal is much more evenly heated and less scale forms on it when heated with oil fuel than when natural gas is used. His estimate of comparative cost is that, when the apparatus is finally adjusted and facilities somewhat improved, the cost of operation with oil at from $1 to $1.25 per bbl. will not be greater than the cost with natural gas at 10 or 12 cents per 1,000 cu. ft.

The Partitions in the Fourth Avenue Tunnel.

The Health Department of New York city has rescinded the order issued by that department last year, directing the New York Central to improve the Fourth Avenue tunnel by taking out the masonry walls which separate the side tunnels from the center. The new President of the Health Board stated some weeks ago that he did not see the wisdom of the order, which was made by his predecessor, and the present action is evidently the result of his investigation of the subject. The railroad company has already taken out parts of these walls, near the south end of the "tunnel," substituting latticed columns, set a few feet apart, to support the artificial roofs of the side tunnels. These columns are set in the line of the brick wall and the wall itself, to the height of about 5 ft., is relaid after the columns are in position, thus making a continuous barrier between the side tunnel track and that in the center tunnel.

Brake-Shoe Consolidation.

The American Brake-Shoe & Foundry Company, which was incorporated under the laws of the State of New Jersey a few weeks ago with a capital of $100,000, will soon increase its capital to $4,500,000. It is a consolidation of the brake-shoe companies of the country and will include the American Brake-Shoe Company, the Sargent Company, of Chicago; the Ramapo Company, Hillburn, N. Y.; Lappin Brake-Shoe Company, New Jersey; Corning Brake-Shoe Company, Corning, N. Y., and the Streator Brake-Shoe Company, of Chicago.

THE SCRAP HEAP.

Notes.

Four new interlocking plants are to be installed at and near the Union Station at Nashville, Tenn. Mr. Thomas's pneumatic apparatus will be used.

The Illinois Central, continuing its experiments with telephones on the telegraph lines of the road, has held conversations over the regular iron wires between Fulton, Ky., and Chicago, 400 miles. The reports do not state whether or not a metallic circuit was used.

Maintaining freight-rate agreements seems to be as badly beset with difficulties on the water as on land. Only about a month ago the steamship lines carrying freight between this country and Glasgow made an agreement not to take grain at less than three cents a bushel, but already one of the lines is accused of having taken a shipment at a cent and a half, and the other predict (of course they do not threaten) the immediate dissolution of the agreement.

A Monorail in America.

An experimental line about half a mile long is projected at Windsor Hills, west of Walbrook, in Baltimore, by a Baltimore company, to run cars on a monorail invented by Howard H. Tunis. A passenger car for the line is being built at the works of the Structural Iron Co., and it is reported that the track is to be built as soon as the weather will permit, so that experiments can be conducted in the spring and summer. The wheels of the car are in the middle, with much of the weight arranged lower than the wheels, to give it stable equilibrium. On top of the car is to be a double rail, which will engage sheaves or rollers suspended from poles on each side of the track, so that the car cannot upset. The car is to be run by a gasoline motor.

Floods in Many States.

Between Feb. 28 and March 4 enormous damage by floods was done in New York, New Jersey and Pennsylvania, and to a less extent in New England and in many places throughout the Eastern States. In Northern New York there was a large body of snow and ice and the warm rain of Saturday melted the snow very fast. The Hudson River was higher than before for many years, and at Castleton, between Albany and Hudson, the main tracks of the New York Central were submerged and impassable for more than three days. The southbound Empire State Express of March 1, with three other important trains, had to be left standing in this water all this time. The passengers were taken off in boats. The New York Central had very serious washouts between Albany and Buffalo. At Sprakers there was one 2,000 ft. long; at Oriskany all four tracks were washed out for a mile, and there was much damage at Palmyra. At Philmont on the Harlem Division a freight train ran into a washout and three trainmen were killed.

At Passaic, N. J., the whole town was flooded for several days and the damage was estimated at a million dollars. Two important bridges were carried away and on one of them six men lost their lives. At Paterson, N. J., which was devastated by a great fire only a few weeks ago, the flood did many thousand dollars' damage. At Trenton, N. J., many washouts were reported and the false work of the new bridge of the Pennsylvania Railroad across the Delaware was mostly carried away. This false work had suffered seriously from a flood once before. At Easton, N. J., one of the piers supporting the bridge of the Central of New Jersey across the Lehigh River broke down and allowed one end of one span of the bridge to fall to the wagon bridge, which crosses diagonally beneath the railroad bridge. At Allentown two large bridges were carried away. The Lehigh Valley line was damaged by many washouts west of Easton. The Erie road suffered in like manner at Hornellsville and many other places. The Pennsylvania Railroad was flooded in the region of Harrisburg. At Wilkesbarre the flood cost six lives and hundreds of thousands dollars' damage. Two men were carried with train into Lehigh River, when the Bridgeport bridge fell in. The train had been run on the bridge to steady it as an ice gorge broke, but the bridge was carried away. The Lehigh Valley, the Central of New Jersey, the Pennsylvania, the Delaware & Hudson and the Delaware, Lackawanna & Western all suffered.

At Pittsburgh the water was as high as in the great flood of 1884; at Philadelphia the Schuylkill was higher than before since 1869. A Baltimore despatch reported the destruction of many bridges and much railroad track in Maryland and West Virginia, with losses aggregating over a million dollars. The Seaboard Air Line lost a bridge near Calhoun Falls, S. C. The Southern Railway and the Norfolk & Western were flooded at many places in Tennessee.

Tree Planting by the Illinois Central.

A newspaper report that the Illinois Central expected to plant catalpa trees all along its right-of-way from Chicago to New Orleans in order to raise timber for its ties is an exaggeration of an interesting fact. What the road intends doing is to experiment on a small scale, using a tract of perhaps 160 acres, which will be set out with catalpa trees.

Wireless Telegraph in Texas.

A press despatch from Dallas says that the Texas Midland Railroad is going to try Marconi's wireless telegraph. President Green says that he expects to have the apparatus ready for use within three months.

"The Railroads" Again.

We have really commenced the importation of pig iron and steel billets in small lots to meet the urgent needs of some manufacturers. For this unexpected change the railroads are wholly responsible. If they could have delivered raw materials to the furnaces with reasonable promptness there would have been no shortage in the supply of either pig iron or billets. This anomalous condition cannot last long, as this country has to-day the capacity for producing all the iron and steel of every description that it can possibly need this year or next year. —*The Bulletin.*

Electric Railroads in Ontario.

In connection with the recent opening of the Provincial Parliament of Ontario, the following tabulated list of 12 companies applying for charters to build electric roads is of some interest. In accordance with these projects 1,046 miles are to be built during 1902, in the territory extending from Cornwall, near Montreal, to Windsor, on the Detroit River, an almost continuous line, while to the north another system will reach from London, Ont., to Owen Sound, skirting the shore of Lake Huron. It is said that two-thirds of the capital to be expended in building and equipping these roads comes from the United States. The following table gives the names of the companies and the approximate mileage which they intend building.

Ontario Electric, total, 321 miles of line; Hamilton Suburban, 76 miles; St. Thomas St. Ry., 33 miles; Aylmer, St. Thomas & London Electric, 33 miles; Loudon Ry. Co., 114 miles; Sandwich, Windsor & Amherstburg, 16 miles; Morrisburg Electric, 29 miles; Petrolia Rapid, 68 miles; Rapid Electric, 40 miles; Toronto & Hamilton Electric, 40 miles; Goderich Radial Lines, 270 miles; Hamilton Radial, six miles.

Jefferson Memorial Road.

A circular is being sent around by a committee headed by Gen. Fitzhugh Lee, stating that it is proposed to build a memorial avenue from the home of President Jefferson to Charlotteville, Va., four miles. It is planned to build in connection with this, a memorial fountain and a memorial bridge, contributions for which may be made payable to John M. White, Charlotteville, Va.

Damascus-Mecca Railroad.

The Constantinople correspondent of *The Times* says that Kiazim Pasha, who is in charge of the Damascus-Mecca Railroad, reports that from El Mezarus the road has been built 25 miles south, and that the rails will be laid immediately. Up to date the funds for this undertaking amount to £400,000, which will soon be increased by the sale of skins of sheep sacrificed at Bairam. The earthworks for the railroad have all been made by soldiers.

A Railroad in the Crimea.

About a year ago studies were authorized for a railroad to join Sevastopol and Yatta. This project has now received the imperial approval and it is supposed that the road will be begun in the spring. It will be about 53 miles long and will give through communication from St. Petersburg to Livadia. The estimated cost is $4,420,000, of which Russian capitalists have promised $1,040,000.

LOCOMOTIVE BUILDING.

The Vandalia has ordered four Moguls from the American Locomotive Co.

The Guayaquil & Quito is having a locomotive built at the Baldwin works.

The Kansas City Belt is having two locomotives built at the Baldwin works.

The New York, Ontario & Western is having three locomotives built at the Cooke works.

The Southern Pacific placed its order for 75 locomotives, reported Jan. 17, with the Baldwin Co.

The Louisiana Long Leaf Lumber Co. has ordered one 10-wheel switch engine from the Baldwin works.

The Chicago & North Western order with the American Locomotive Co. calls for nine freight, 10 switch and six passenger engines. The freight engines are 10-wheel, with cylinders 21 x 26 in. The switch engines are duplicates of the 20 now building at Providence, and the passenger engines are duplicates of the North Western type.

The Louisville & Nashville order with the Rogers works, mentioned last week, calls for 10 simple consolidation locomotives, for December, 1902, delivery. Weight on drivers, 150,000 lbs.; total weight, 173,000 lbs. Cylinders, 21-in. diam.; stroke of piston, 28 in. Drivers, 56 in. Belpaire boiler, 190 lbs. working steam pressure. Fire-box, 128 in. long, 40 in. wide, of steel. Tank capacity, 5,000 gals. of water and 12,000 lbs. coal. Westinghouse air brakes, steel axles, approved bell ringers and brake beams, cast-iron brake shoes, U. S. metallic packing and valves, Nathan sight-feed lubricators, and approved springs, driving-wheel tires and steel wheel centers.

CAR BUILDING.

The American Cotton Oil Co. has ordered 250 tank cars from the American Car & Foundry Co.

The American Car & Foundry Co. is building 152 cars of various types for miscellaneous parties.

The Southern Missouri & Arkansas is having four coaches built at the Barney & Smith works.

The Colorado & Southern has ordered 200 box and 100 stock cars from the American Car & Foundry Co.

The Burlington, Cedar Rapids & Northern is building 50 furniture cars, and will build 50 flat cars in its own shops.

The Rutland has ordered 300 flat, 100 coal, 40 stock and 15 refrigerator cars from the American Car & Foundry Co.

The Government Railways of Jamaica are reported to have ordered about 30 fruit cars from the Allison Mfg. Co., Philadelphia.

The International & Great Northern is reported to have ordered 500 box cars and 1,000 coal cars from the American Car & Foundry Co.

The Pittsburgh & Lake Erie is reported to have ordered 100 wooden coke cars, to be built at its own shops, in addition to similar orders recently placed.

The Michigan Central has placed an order with the Rodger Ballast Car Co. for 75 of its new convertible ballast and flat bottom gondola cars and one standard distributing or plow car for June delivery.

The Canadian Pacific order of 500 freight cars from Rhodes, Curry & Co., mentioned last week, calls for cars of 80,000 lbs. capacity, 36 ft. long, 8 ft. 6 in. wide, and 8 ft. high, with wooden underframes, steel axles, Sterlingworth brake beams, Tower couplers, Jones doors, Butler draft rigging, M. C. B. journal boxes and lids, Chicago-Cleveland roofs, C. P. R. standard trucks and cast-iron wheels.

BRIDGE BUILDING.

BEAVER, PA.—The Beaver & Monaca Bridge Co. was incorporated Feb. 27 by Wm. H. Beach, Pittsburgh, Pa.; H. C. Fry, Joseph A. West, Beaver; H. W. Klein, Allegheny; J. Frank Peffer, Tarentum, Pa., and Wm. M. Beach, Pittsburgh, to build a bridge across the Ohio River to a point at or near Beaver avenue in the Borough of Beaver.

BEDFORD, PA.—Reports from this place announce that railroad bridges crossing Dunning Creek and a branch of the Juniata River have been washed away by the freshets. The new county bridge at Mann's Choice has also been destroyed.

BUFFALO, N. Y.—Bids are wanted, March 27, by the Commissioner of Public Works for a bascule bridge in South Michigan street over the City Ship Canal. Information can be had from C. M. Morse, Deputy Engineering Commissioner.

BUCKINGHAM, VA.—The Virginia Senate has passed a bill authorizing Buckingham County to build a large bridge.

CALUMET, MICH.—The County Board of Supervisors has been holding special meetings to consider an order of the War Department requiring changes in the county bridge. L. H. Richardson, County Clerk.

CECIL, W. VA.—S. D. Brady & Son, of Clarksburg, W. Va., are making plans for a bridge for the Pleasant Creek Coal Co., of Fairmount, which is to cost $20,000.

CINCINNATI, OHIO.—We are told that there is no truth in the report that the Cincinnati Southern railroad bridge over the Ohio River will be rebuilt. It is a fact, however, that the company has just let a contract to C. L. Strobel, of Chicago, to replace the wooden trestle approach to the Ohio River bridge in Cincinnati, with a steel trestle 715 ft. long. The company has also contracted with the American Bridge Co. for two through plate girder spans, one over Opossum Creek, 46 ft. long, and two over Little Soddy Creek, 64 ft. long.

CLEVELAND, OHIO.—Plans are being made by City Engineer Carter for widening the Superior street viaduct about 20 ft. and replacing the present swing draw with a double rolling lift draw, 50 ft. longer than the present draw. It is said that the total cost of this change will be about $100,000.

COLONA STATION, ILL.—The Chicago, Rock Island & Pacific has in contemplation for the coming year the renewal of its Rock River bridge near this place. The new structure is to be double track, having eight through truss spans averaging 158 ft. each, with two 79-ft. plate-girder end spans.

COLUMBIA, PA.—A bridge and dam over Muddy Creek, in York County, were destroyed by the freshet. The bridge cost $7,000.

COLUMBUS, GA.—According to reports from Columbus, the freshet has carried away a bridge at this city.

COLVAY, N. Y.—A 500-ft. bridge is proposed over the railroad tracks near the fair grounds. Estimated cost, $40,000. The Railroad Commissioners are considering the application of the town trustees.

CUMBERLAND, MD.—The large steel bridge at Confluence, on the Pittsburgh Division of the Baltimore & Ohio, 90 miles from Pittsburgh, was reported washed out on Feb. 28.

DENNISON, OHIO.—Bids are wanted by the Commissioners of Tuscarawas County for a stone arch bridge over Little Stillwater Creek on what is known as Cedar street. C. C. Fernsell, County Auditor.

DENVER, COLO.—It is stated that bids are wanted, March 10, for two steel bridges on Wolpert Road.

DES MOINES, IA.—The City Engineer and the Park Board are authorized to select a location for a bridge across the Des Moines River, to be in the vicinity of Boatman's Island, so as to be accessible from Union Park.

EASTON, PA.—The freshet on March 1 undermined a pier on the Central R. R. of New Jersey's double track bridge over the Lehigh and caused two spans to fall. The county bridge has also been destroyed.

ELIZABETHTON, TENN.—The Virginia & Southwestern R. R. bridges at Elizabethton, Butler and Carden's Bluff have been washed away. They cross the Watauga and Doe rivers.

FREEPORT, ILL.—Four new bridges are to be built in Kent Township, four in Loran and two in Rock Run. Address the Supervisors.

FORT SCOTT, KAN.—A steel bridge is proposed over Mill Creek on National avenue. It will cost about $4,000 and the County Commissioners have been offered private subscriptions.

HARRISBURG, PA.—The second and third sections of the camel back bridge on the Harrisburg side of the river were washed away, March 2. The bridge was built in 1816 and is said to be the oldest highway bridge across the Susquehanna River. It is owned by Harrisburg capitalists and will be rebuilt at once.

HARTFORD, CONN.—The Common Council has accepted the plans for a stone bridge, with approaches as proposed under the "compromise" plan.

HERKIMER, N. Y.—Two sets of plans made by the Osborn Engineering Co., Cleveland, Ohio, for the big bridge of the Utica & Mohawk Railway Company to span the West Canada Creek and the tracks of the New York Central Railroad at Herkimer, are at the company's office for inspection. One set provides for a steel structure, running from Eastern avenue in Herkimer, across the river flats, over the big creek and over the Central tracks to the bluffs on the north side. The second set provides for a series of concrete arches. The latter plans will probably be accepted.

HUNTONBURG, ONT.—A bridge is proposed over Lemay's Creek, at a cost of $4,000.

LANSING, MICH.—A viaduct is proposed on Pennsylvania avenue under the tracks of the Grand Trunk Ry. City Engineer H. A. Collar recently told us that it would probably be built of wood, but local newspaper reports now say that it will be of steel girders.

LAWRENCE, MASS.—A viaduct will be built at Essex street. The city and the Boston & Maine R. R. are interested. The viaduct will be 50 ft. wide and about 2,230 ft. long. Including approaches, it will be 3,125 ft. Probable cost, $500 000.

MASON CITY, IOWA.—The citizens are asking that the Iowa Central bridge be made wider as agreed upon by the railroad company.

MEMPHIS, TENN.—The Southern Ry., according to report, will spend about $300,000 on improvements at the Decatur bridge over the Tennessee River.

MINNEAPOLIS, MINN.—The County Surveyor has been ordered to make plans for the new iron bridges for what are known as bridges Nos. 61, 201 and 202 in Maple Grove; No. 44 in Edina, and No. 152 in Even Prairie.

MINDEN, N. Y.—A bill is before the State Legislature for an appropriation of $6,500 for a bridge over Otsquago Creek.

MONACA, PA.—Chief Engineer J. A. Atwood, of the Pittsburgh & Lake Erie, is reported as saying that the company has not yet taken up the plans for widening the bridge across the Ohio River at Monaca.

MOUND CITY, ILL.—Bids are wanted, March 17, by Lieutenant-Colonel C. R. Barnett, Depot Quartermaster, St. Louis, Mo., for a steel bridge over a slough at Mound City, for the Government.

NASHVILLE, TENN.—The County Court is considering spending about $10 000 or $12,000 on repairing roads and bridges.

Norristown, Pa.—Several small county bridges were carried away at various points along the Perkiomen Creek.

North Yakima, Wash.—Chairman Frank Horsley, of the Board of County Commissioners, is reported as saying that at the next meeting, the Board will consider the matter of building two bridges across the Yakima near this town. The two bridges will cost about $20,000.

Ogdensburg, N. Y.—A bill is before the State Senate for a bridge over Tibbitt's Park ravine at the St. Lawrence Hospital. Probable cost, $31,000.

Paterson, N. J.—The bridge of the New York & Greenwood Lake Division of the Erie, over Passaic River at Singac, was destroyed by the freshet last Sunday, as was also the Arch street bridge in the city of Paterson.

Plainville, Ohio.—The County Commissioners are considering building a 2-span bridge across the Chagrin River a mile south of its mouth, at a cost of $20,000. A vote will soon be taken.

Petersburg, Va.—The Commissioners of Brunswick and Dinwiddie counties are considering building a new bridge over Nottaway River.

The Seaboard Air Line bridge over the Roanoke River at this place gave way on Feb. 23.

Quincy, Mass.—New bids are wanted at 2 p. m. of March 18 for the steel bridge over Weymouth Fore River. Address the County Commissioners at Dedham, or I. W. Hildreth & Co., Engineers, New York City.

Richmond, Va.—We are told that the Richmond Passenger & Power Co. has decided to build a bridge over James River at or near the foot of Seventh street. It will be about 2,000 ft. long, either girder or truss, and the probable cost is $150,000. Calvin Whiteley, Jr., Chief Engineer.

The Virginia House has passed a bill to incorporate the Manchester & Richmond Free Bridge Co.

Richford, Vt.—It is reported that the Canadian Pacific Ry. will build a new bridge across Missisquoi River at this place.

Saginaw, Mich.—Bids for building a bridge across the river at Genesee avenue were opened, Feb. 27. About 50 bids were received, from four firms. The King Bridge Co. put in no less than 30 tenders, ranging from $207,925 to $152,327. The American Bridge Co.'s price ranges from $149,000 to $188,000; Chicago Bridge & Iron Co., $181,000 to $192,000, and the National Co. from $147,000 to $198,000.

St. Louis, Mo.—Local papers state that a viaduct is proposed from Manchester avenue to Northrup, on the road known as King's Highway. The structure is to be about 2,700 ft. long, including the approach and abutments, the bridge proper to be 350 or 400 ft. long. Estimated cost, $300,000.

St. Mary's, Ont.—A steel bridge will be built over Reynolds Creek at Dorchester.

San Antonio, Texas.—The Southern Pacific Co. proposes to build a steel viaduct over its tracks on one of the streets leading to Dignowity Hill. Probable cost, $40,000.

San Francisco, Cal.—Some bridges in the town of Napa have been washed away by recent freshets. The rivers in central and northern California are reported to have overflowed and destroyed several bridges.

Scranton, Pa.—It is said that bridges along the Lackawanna R. R., between this place and Carbondale, have been considerably damaged. Some have been washed away.

Spokane, Wash.—It is reported that a steel bridge will be built over Hanyman's Creek.

Strasburg, Va.—The Board of Supervisors is considering a site for the proposed bridge over the north fork of Shenandoah River, for which $4,000 is appropriated.

Struthers, Ohio.—It is reported that the County Commissioners have approved plans for a bridge near this place for the Pittsburgh & Lake Erie R. R.

Sydney, C. B., N. S.—Hiram Donkin, C. E., formerly with the Dominion Coal Co., at Grace Bay, is reported to have made plans for the projected railroad bridge over the Strait of Canso. The bridge will probably extend from Cape Porcupine to near McMillan's Point, Port Hastings. The plan provides for a cantilever bridge of 1,800 ft., with two piers in 80 ft. of water, with approaches of 1,070 ft. and 300 ft. of trestle work on either side. The bridge will have two railroad tracks and a roadway on each side. It is to be 150 ft. above high-water mark.

Utica, N. Y.—The New York Central & Hudson River R. R. is considering eliminating grade crossings at Division and Genesee streets and at Park avenue. The matter is before the Councils.

Valley Forge, Tenn.—The East Tennessee & Western North Carolina R. R. has lost its bridge at Valley Forge.

Warren, Minn.—Bids are wanted, March 10, by the County Auditor, A. B. Nelson, for digging some trenches and building bridges.

Washington, Pa.—The County Court has approved of a bridge in East Finley Township, a bridge over the creek in Fallowfield Township, and a bridge over Ten-mile Creek in Carroll Township.

Waterloo, Iowa.—The contract for the concrete steel bridge over Cedar River at Fourth street has been let to the Marsh Bridge Co., of Des Moines, at $49,474. The other bidders on this work were W. S. Hewitt & Co., Minneapolis, $52,500; Western Construction Co., Waterloo, $51,500.

Westboro, Ont.—Bids are wanted by F. W. Harmer, Clerk, Nepean Township, until March 13, for the superstructure of three riveted lattice steel spans to replace bridges over Jock River. J. B. Lewis, engineer in charge.

Wilmington, Del.—The Peoples Ry. Co. has plans made for a bridge over the Brandywine at Poplar street.

Winnipeg, Man.—The Board of Works is considering a plan for a bridge over the Canadian Pacific tracks at Point Douglas by the Canadian Northern.

Woodsville, N. H.—The question of building a new highway bridge across the Connecticut River is again under consideration.

Yonkers, N. Y.—The freshet of last week caused the bridge in Warburton avenue, connecting Yonkers with Hastings, to fall.

Other Structures.

Alexandria, La.—It is reported that the Texas & Pacific Co. intends to build a new brick depot here very much like the station at Terrell, Texas. It is also stated that the Southern Pacific contemplates building a passenger station in the city in the near future.

Atlanta, Ga.—According to local reports, Governor Chandler has written to a number of prominent architests regarding plans for the proposed union depot which the State will build in Atlanta.

Baltimore, Md.—The Baltimore & Ohio is said to have completed negotiations for more extensive terminals on the Locust Point side of the harbor at Baltimore. The Locust Point Terminal & Forwarding Co. has transferred to the railroad company its wharf properties, which cover 200,000 sq. ft. The railroad company will build new piers.

Bangor, Me.—The Maine Central passenger station in this city will be extended.

Battle Creek, Mich.—The Battle Creek Iron Works Co., Ltd., recently organized, will build a foundry and machine shop here. Among those interested are: P. T. Colgrove, M. S. Curtis and Clement Smith.

Buffalo, N. Y.—Kendrick & Roberts have a contract from the Lackawanna Iron & Steel Co. for a building 120 x 667 ft.

Des Moines, Iowa.—F. M. Hubbell is reported buying property on which to build a terminal station in Des Moines which will be used by the Des Moines, Iowa Falls & Northern. The property already bought is practically a full block on the south side of Court avenue, between East Sixth and East Seventh streets.

Lansdale, Pa.—Bids are being received by the Chief Engineer of the Reading for the new passenger station to be built at this city.

Macon, Ga.—A plan is under consideration for the consolidation of all the railroads entering Macon in a union station. It is proposed to use the present depot of the Central of Georgia, after enlarging it.

Manchester, Vt.—Plans have been made for a new passenger station for the Rutland R. R., in Manchester. New stations will also be built at Arlington, Sunderland and South Wallingford.

Marietta, Ohio.—The Marietta Sheet Steel & Tin Plate Co., in which L. C. Taylor, of Cambridge, Ohio, is interested, will build a tin plate and sheet steel plant at East Norwood, a part of Marietta. It is proposed to spend about $150,000.

New Decatur, Ala.—The Louisville & Nashville, according to report, will soon make improvements at the shops in this city. The foundry and blacksmith shops will be enlarged, as will also the car department.

New Orleans, La.—The U. S. Senate, on Feb. 28, passed a bill appropriating $1,250,000 for a site and building for the United States Government at New Orleans, the amount to cover the cost of vaults, heating, ventilating apparatus, elevators, lighting, etc.

Philadelphia, Pa.—Wm. Steele & Son have filed revised plans with the Building Department for the power house to be built by the Philadelphia Electric Co. at 26th and Christian streets. Wm. T. Windrim is the architect. It is said bids are being received.

St. Paul, Minn.—Mr. Geo. Hill, who was Consulting Engineer for the new shops of the Central R. R. of New Jersey, at Elizabethport, described in the *Railroad Gazette*, Dec. 27, 1901, and Jan. 3, this year, has been retained as Consulting Engineer for the Great Northern shops to be built at Como, St. Paul.

Savannah, Ga.—The Savannah Union Station, which was described and illustrated in the *Railroad Gazette*, Aug. 7 last, will probably be ready for use by April 1.

Sterling, Ill.—The directors of the Dillon-Griswold Wire Co. have authorized its General Manager to make some improvements in the various departments which will call for an expenditure of a large sum of money.

Toledo, Ohio.—The Cincinnati, Hamilton & Dayton is reported considering making extensive improvements to the docks and trestles at Toledo.

Utica, N. Y.—It is said that the New York Central & Hudson River R. R. will build its new freight station in Utica this spring. The new building will be of brick and face on North Genesee street. It will be 1,200 ft. long and 100 ft. deep. The company also will build a passenger station here.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad associations and engineering societies see advertising page xix.)

A New Canadian Railroad Club.

A meeting will be held on March 11, at Montreal, by a number of railroad people to adopt by-laws and constitution for a railroad club, to have headquarters in that city.

Western Society of Engineers.

Mr. W. M. Torrance, of the Civil Engineering Department of the Chicago & North Western, will present a paper before the Western Society of Engineers, Wednesday evening, March 5, entitled, "The Transition Spiral."

Car Foremen's Association of Chicago.

The regular meeting of the Car Foremen's Association of Chicago will be held in Room 209, Masonic Temple, Chicago, Wednesday evening, March 12, at 8 o'clock. The following programme has been arranged: Discussion of report of committee appointed to formulate a list of questions for the examination of candidates for car inspectors; report of committee on repair track appliances and facilities, and a discussion of M. C. B. Rules 1, 2 and 3.

Central Railway Club.

The next regular meeting of the Central Railway Club will be held at the Hotel Iroquois, Buffalo, N. Y., on Friday, March 14, 1902, at 2 p.m., the Executive Committee meeting at the same place at 1 p.m. In accordance with the disposition made of the committee reports at the January meeting their discussion will be continued, the subjects being as follows:

"Best Methods in Shop Practice in Meeting Requirements for the Maintenance of All-Steel Cars; Probable Future Shop Changes Necessary."

"Best Improvement in Boiler Design and Best Proportions of Heating and Grate Surface for Different Kinds of Coal."

The President has appointed the following committee to report recommendations relative to a revision of the Rules of Interchange for the consideration of the Arbitration Committee of the M. C. B. Association at their meeting in April: J. A. Bradley, Foreman, N. Y. C. & H. R. R., Buffalo, Chairman; G. W. Seidel, M. M., N. Y. C. & St. L. R. R., Buffalo, and James B. Martin, Clerk to Arbitrator, Buffalo.

The Railway Signaling Club.

The next meeting of the Railway Signaling Club will be held at the Great Northern Hotel, Chicago, March 11. The principal subject is "Derailments at Interlocking Plants." After the discussion on this subject is closed, the members are requested to bring up any matter of interest. On the main subject Mr. Charles Dunham (Illinois Central) sends the following letter:

A number of derailments which have occurred recently at interlocking plants point to the necessity of providing appliances to prevent such occurrences. I have in mind several cases where a towerman took a home signal away from an approaching train after same had passed the distant signal, which had indicated "Proceed," opening the derail, with the result of a wreck of a more or less disastrous nature.

To prevent such accidents electric locking has been applied to some extent. The electric lock affords the protection for which it is intended, but for certain reasons its use has not been very general. The first cost of electric locking, which is about $400 for a simple crossing, has not stood in the way of its general use; the maintenance expense, however, is a matter of more weight as it sometimes costs more to maintain the electric locks than it does to maintain the interlocking plant. Of course, I am now referring to points more or less isolated where a considerable portion of the repairman's time is spent in traveling. Quite recently I have been experimenting with a time locking device which is now on the market, which in a large measure fulfills the function of the electric lock. The time lock is applied to the home signal lever and connected with the locking of the machine in such a manner that after the home signal lever has been placed in the normal position a certain time limit must expire before the derail can be opened. The time limit may be made to cover a period anywhere between 15 seconds and 2¾ minutes. As a train ordinarily will not consume more than 30 seconds while running between the distant and the home signals it will be seen that the time lock which requires a minute or perhaps less in which to run down would prevent any change in the combination immediately in front of an approaching train. The time lock is intended for use in connection with the ordinary mechanical machine, but cannot be used on a power machine. It can be set up complete at an expense of not to exceed $55 a lock. It is a very simple device with nothing about it to get out of order and should cost practically nothing for maintenance. There is almost a universal demand for some means of preventing accidents of this kind. My own experience has led me to believe it is more necessary to provide some locking device at small isolated crossings than at large busy plants.

American Society of Civil Engineers.

At the annual meeting the following resolutions were adopted:

(1). "Resolved, That it is the sense of this meeting that the Board of Direction shall have the power to classify applicants before their names appear on any published list of candidates; and, further

"Resolved, That a committee be appointed to report an amendment to the Constitution which shall embody this idea at the next Annual Convention for consideration.

(2). "Resolved, That a committee be appointed to report to the next Annual Convention upon raising the standard of qualifications for the several grades of membership."

The President has appointed the following committee to report under these resolutions at the Annual Convention to be held in Washington, May 20:

District No. 1—H. G. Prout, Chairman.
District No. 2—H. A. Carson.
District No. 3—G. S. Williams.
District No. 4—T. H. Johnson.
District No. 5—E. J. Blake.
District No. 6—D. Bontecou.
District No. 7—J. D. Schuyler.

The following are the dates and subjects of the next four stated meetings:

March 5.—Ballots on the proposed amendment to the Constitution will be canvassed, and a paper by George S. Morison, Past President, Am. Soc. C. E., entitled, "The Bohio Dam," will be presented for discussion. This paper was printed in the *Proceedings* for January.

March 19.—A paper by C. A. P. Turner, M. Am. Soc. C. E., entitled, "Thermo-Electric Measurement of Stress," will be presented for discussion. This paper was printed in the *Proceedings* for January, 1902.

April 2.—Two papers will be presented, one by Marsden Manson, M. Am. Soc. C. E., entitled "A Brief History of Road Conditions and Legislation in California," and the other by Charles C. Wentworth, M. Am. Soc. C. E., on "Line and Surface for Railway Curves." These papers are printed in *Proceedings* for February.

April 16.—Two papers will be presented for discussion, as follows: "Is It Unprofessional for an Engineer to be a Patentee?" by Archibald R. Eldridge, M. Am. Soc. C. E.; and "The Stiffening System of Long-Span Suspension Bridges for Railway Trains," by Joseph Mayer, M. Am. Soc. C. E. These papers are printed in *Proceedings* for February.

Searches in the Library.

As stated in the Annual Report, the Board of Direction has directed the Secretary to make a charge for such library searches and correspondence as do not fall within the regular duties of employees, which shall cover the actual cost of any extra work undertaken for an individual. The only difficulty about this matter seems to be the impossibility of fixing in advance the scope and cost of any such search. It can only be said in general that the time of an employee competent to do such work is paid for by the Society at from 30 to 40 cents per hour, and that to this must be added the actual cost of typewriting. Inasmuch as this idea was adopted experimentally, in the belief that it would prove of value to non-resident members, and as it is not the intention to realize any profit, it would seem that, in asking that such searches be made, the risk is not great, particularly as a limit of the total expense to be incurred might easily be specified by the member.

PERSONAL.

—Mr. Davis Winne, a Director of the Ulster & Delaware, died Feb. 27, aged 84 years.

—Mr. W. E. Kittredge died Feb. 24, aged 82 years. He was born at Cobourg, Canada, in 1820, and entered railroad service in 1833 in the shops of the Michigan Central at Detroit. In 1865 he was made Master Mechanic of the La Crosse & Milwaukee, which was merged into the Chicago, Milwaukee & St. Paul. In 1881 he became Master Car Builder of the Northern Division of the last-named road, and in 1885 became Assistant Superintendent of the car department.

—Capt. Edgar Jadwin, Corps of Engineers U. S. A., now on duty at New York, has been ordered to Los Angeles, Cal., to the place recently vacated by the death of Capt. J. J. Meyler. Capt. Jadwin's new duty includes

the charge of the defensive works at San Diego, the improvements of the harbors of Wilmington, San Diego and San Luis Obispo and the construction of the breakwater at San Pedro. Capt. Jadwin will be succeeded as recorder and disbursing officer of the Board of Engineers at New York by Lieut. Edward H. Schulz.

—Mr. J. C. Nelson, who has been appointed Roadmaster of the Alabama Great Southern Railroad, returns to service where almost his first railroad work was done, and where he was an Assistant Engineer in 1891. Mr. Nelson has been until recently Division Engineer of the New York Central & Hudson River Railroad. He is an active member of the Maintenance of Way Association, for which he has made valuable studies and reports as a committeeman. He is a good example of the studious engineer with an inborn capacity for controlling men.

—The new Assistant Engineer of Motive Power of the Philadelphia & Erie Railroad Division of the Pennsylvania Railroad, Mr. J. M. Henry, was born in 1873, and began service with this company in 1890, serving four years as an apprentice in the machine shops at Altoona. He was later transferred to the test room. From there he entered Purdue University and graduated with the class of 1900. Mr. Henry re-entered the service of the Pennsylvania in June the same year and the following year (1901) was made Inspector. He assumed his new duties, as stated above, February 1, 1902.

—Mr. Ezra B. Westfall, Division Superintendent of the Pennsylvania Railroad at Williamsport, Pa., died Feb. 26. He was born at Bairdstown, Westmoreland County, Pa., Aug. 29, 1837. He entered the service of the Portage Railroad in 1852 as stationary fireman, serving as such until Aug. 1, 1854, when he entered the service of the Pennsylvania as a brakeman. In 1863 he was made yardmaster of the Philadelphia & Erie. In August of the same year he was promoted to Trainmaster. In 1873 he was made Superintendent of the Sunbury Division, and four years later was transferred to the Superintendency of the Middle Division at Renovo. In 1883 he was again transferred to the Superintendency of the Eastern Division and of the Susquehanna Division of the Northern Central.

—Mr. G. W. Kenney, Superintendent of Motive Power and Rolling Stock of the Rutland, is a native of Vermont. He was born in 1845. At the age of 18 he enlisted in the Seventeenth Vermont, and at the close of the war took a position with the above company as locomotive fireman. In 1870 he was promoted to be engineman. In 1882 he became Division Master Mechanic at White River Junction under the Central Vermont management (the Rutland being a part of their system at that time). This position he held until 1891 when he became Division Master Mechanic at Rutland. Mr. Kenney served in this capacity until 1896, when the Rutland Division of the Central Vermont was turned back into the hands of its owners. He then became Superintendent of Motive Power, and in August, 1901, his jurisdiction was extended over the entire system.

—Mr. Jerome A. Fillmore, for several years Manager of the Southern Pacific Company (Pacific System), died Feb. 27, of pneumonia. Mr. Fillmore began his career in 1866 as a brakeman on the Delaware, Lackawanna & Western Division of the Union Pacific. In 1871 he was appointed Assistant to the Assistant General Superintendent of the Central Pacific. Two years later Mr. Fillmore was made Division Superintendent of the Sacramento and Oregon Divisions. He rose rapidly, and in 1882 was made General Superintendent of the Southern Pacific Company, comprising all lines west of El Paso. In 1895 he was made Manager of the entire Pacific System, resigning last spring. Since that time Mr. Fillmore has not been actively employed until about a month ago, when he assumed the management of the North Shore. He was born in Onondaga County, N. Y., in 1845.

—We regret to have to record the death of Mr. Gratz Mordecai, of the Transportation Department of the Pennsylvania Railroad at Philadelphia. Mr. Mordecai died, Feb. 28, at Swarthmore, Pa., of pneumonia. The readers of the *Railroad Gazette* will miss him more than they know, because hardly a year passed without his contributing something of considerable value to our columns. In 1885 he wrote a series of papers on the Terminal Facilities of the Port of New York, which were afterwards published in a book and which still remains a unique study, although the terminals have changed much since the study was made. Mr. Mordecai was studious and industrious and had unusual powers of analysis, and had done a good deal to build up the art of transportation, although not more than half a dozen people in the world can ever know what he did in that way, which is one of the penalties of anonymous writing. Mr. Mordecai was a son of the late Major Alfred Mordecai, of the United States Army, and his oldest brother, Colonel Alfred Mordecai, is now a distinguished officer of Ordnance. Another brother, Mr. Augustus Mordecai, is Assistant Chief Engineer of the Erie Railroad, stationed in Cleveland.

—The 70th birthday of Karl von Thielen, the Prussian Minister of Public Works, and as such at the head of the Prussian State Railroads, and also chief executive of the Alsace-Lorraine railroads, which belong not to Prussia but to the German Empire, was celebrated Jan. 30 last, on which occasion the *Journal* of the German Railroad Union gave a sketch of his career, which has an interest to us as indicating the kind of experience which has resulted in reaching the head of the greatest railroad system in the world. Thielen is a son of an army chaplain; he studied in the gymnasimu at Coblenz, and studied law in the Universities of Bonn and Berlin. The study of law in Germany is the preparation for many minor court appointments and for the higher branches of many administrative departments. After service in connection with certain courts Thielen, in 1860, at the age of 28, entered the administrative service, and served for four years in small towns. In 1864 he entered the State Railroad service, at first in the general office of a railroad, then for a year as an assistant in the ministry at Berlin. During the year 1866 he was a member of the Breslau "directory," which was the responsible office in charge of the working of one of the State Railroads (then not numerous and usually not extensive). He was then transferred to the Minister's office again, but within a few months was called to take a place in the general offices of the Rhenish Railroad Company, which was one of the best-managed railroads in Germany in those days. He rose here to a position somewhat like that of General Manager's assistant, which he held when the State acquired the railroad in 1880. A year later he was made President of the State Railroad Directory at Elbenfeld, and as such was chief executive of a considerable railroad system. He was transferred to the Hanover directory in 1887 and in 1890, on the retirement of Maybach, was appointed Minister of Public Works. The demonstrations on his birthday indicate that the Minister not only is regarded as a very able man, but that he is very much liked by his subordinates.

ELECTIONS AND APPOINTMENTS.

Alabama Great Southern.—A. J. Love has been appointed Assistant Superintendent. J. C. Nelson has been appointed Roadmaster, with headquarters at Birmingham, Ala.

Atchison, Topeka & Santa Fe.—C. H. Gaunt has been appointed Superintendent of Telegraph, succeeding C. G. Sholes, resigned.

Baltimore & Ohio.—J. B. Dickson has been appointed Assistant Engineer Maintenance of Way.

Birmingham Southern.—W. T. F. Warren, Secretary, Auditor and Traffic Manager, has resigned.

Burlington, Cedar Rapids & Northern.—J. McNulty has been appointed Roadmaster, with headquarters at Iowa Falls, succeeding P. O'Neil, resigned. M. Tracy succeeds Mr. McNulty as Roadmaster at Garner.

Canadian Pacific.—P. A. Peterson, heretofore Chief Engineer, has been appointed Consulting Engineer. H. E. Vautelet will, until further notice assume the duties of Chief Engineer, succeeding Mr. Peterson.

G. J. Bury, heretofore Division Superintendent at Cranbrook, B. C., has been appointed Assistant General Superintendent of the Lake Superior Division, with headquarters at North Bay.

Chicago & Alton.—C. Skinner has been appointed Master Mechanic, with headquarters at Slater, Mo.

Chicago & North Western.—P. J. O'Brien has been appointed Assistant Superintendent of the Wisconsin Division.

Chicago, Burlington & Quincy.—C. B. Young has been appointed Mechanical Engineer, with headquarters at Chicago, and J. S. Goddard succeeds Mr. Young as Chief Draftsman. F. A. Torrey becomes Master Mechanic of the Creston Division, succeeding E. Jones, resigned, and I. N. Funk succeeds Mr. Torrey as Acting Master Mechanic of the Ottumwa Division, effective March 1.

Chicago Great Western.—Tracy Lyon has been appointed Assistant General Manager. G. A. Goodell succeeds Mr. Lyon as General Superintendent, effective March 3.

L. P. Desilets has been appointed Supervisor of Bridges of the Southwestern Division, succeeding J. I. Banks. H. A. Fergusson has been appointed General Shop Foreman, with headquarters at Oelwein, Iowa.

Cleveland, Cincinnati, Chicago & St. Louis.—W. J. Thomas has been appointed Master Mechanic of the Cairo Division, with headquarters at Mt. Carmel, Ill., succeeding H. G. Hudson, transferred.

Erie.—R. H. Wallace has been appointed Assistant General Passenger Agent, with headquarters at Cleveland, O.

Evansville & Terre Haute.—G. H. Ball has been elected Vice-president. The following new Directors were elected: H. Seibert, H. H. Porter and G. H. Ball.

Grand Trunk.—F. H. McGuigan, heretofore General Superintendent, has been appointed Manager. This is a new position, recently created.

Great Northern.—A. H. Hogeland has been appointed Assistant Chief Engineer, with headquarters at St. Paul, effective March 1.

Gulf, Colorado & Santa Fe.—J. R. Mitchell has been appointed Master Mechanic of the Northern Division, with jurisdiction over Cleburne Shops.

Houston & Texas Central.—W. H. Field has been elected Secretary and Treasurer, succeeding E. W. Cave, resigned.

Jamestown, Chautauqua & Lake Erie.—S. W. Hayes, heretofore Engineer of Track Elevation of the Delaware, Lackawanna & Western, has been appointed Chief Engineer of the J., C. & L. E., with headquarters at Westfield, N. Y., effective March 1.

Kansas City Southern.—The position of Auditor of Freight and Passenger Receipts has been abolished and J. I. Morrison has been appointed Auditor of Receipts and H. B. Johnson becomes Auditor of Disbursements.

Lake Shore & Michigan Southern.—H. H. Vaughn, Superintendent of the Chicago Heights (Ill.) plant of the Railroad Supply Co., has been appointed Assistant Superintendent of Motive Power of the L. S. & M. S., effective March 15.

Mexican National.—H. M. Taylor, heretofore Division Superintendent at San Luis Potosi, has been appointed Superintendent of Construction, in charge of the construction of the new line between Huehuetoca and Soria.

New York Central & Hudson River.—Charles H. Hogan, heretofore Master Mechanic at East Buffalo, has been appointed Master Mechanic of the River Division of the West Shore, with headquarters at New Durham, succeeding E. A. Walton, promoted. Mr. Hogan's jurisdiction has been extended to include the engine houses and engines on the Mohawk Division, West Shore, to, but not including Syracuse. The Master Mechanic of the Middle Division is relieved of jurisdiction over the Mohawk Division, West Shore. W. J. McQueen has been appointed Assistant Master Mechanic of the Hudson, Harlem and Putnam Divisions, with headquarters at Mott Haven. The Assistant Master Mechanic will have jurisdiction over engines, engine crews and engine houses. J. O. Bradeen succeeds Mr. Hogan as Master Mechanic of the Western Division with headquarters at East Buffalo, effective March 1.

Northern Pacific.—G. W. Vanderslice, heretofore Division Superintendent at East Grand Forks, Minn., has been appointed Superintendent of the Lake Superior Division, with headquarters at Duluth, Minn., succeeding E. L. Brown.

Oregon R. R. & Navigation Company.—See Union Pacific.

Oregon Short Line.—See Union Pacific.

Pennsylvania.—William A. Pratt, heretofore Engineer of Bridges, has been appointed Assistant to the Chief Engineer. Henry R. Leonard succeeds Mr. Pratt as Engineer of Bridges.

Pittsburgh & Western (Baltimore & Ohio).—The position of Master Car Builder, held by Thomas Anderson, has been abolished.

San Antonio & Aransas Pass.—E. C. Tarrant has been elected Treasurer, succeeding W. H. Field, resigned. (See Houston & Texas Central.)

Southern Pacific.—See Union Pacific.

Tennessee Coal, Iron & Railroad.—J. L. Gaines, Assistant General Manager of the Tennessee Division, with headquarters at So. Pittsburgh, Tenn., has resigned.

Texas Central.—H. N. Marache has been elected Secretary and Auditor, succeeding Richard Oliver, resigned. S. H. McCartney becomes Cashier.

Texas Midland.—F. B. McKay has been appointed General Freight and Passenger Agent, with headquarters at Terrell, Texas, succeeding J. E. Leith, resigned, effective March 1.

Union Pacific.—B. Campbell, heretofore Traffic Manager of the Oregon R. R. & Navigation Co., has been appointed Assistant Traffic Director of the U. P., the O. R. R. & N., the Southern Pacific and the Oregon Short Line.

Western Maryland.—J. M. Hood, President and General Manager, has resigned, to take effect on the election of his successor.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

ATCHISON, TOPEKA & SANTA FE.—The W. R. Stubbs Contracting Co. now have 30 miles more of work ready to sublet between Blackberry Junction and Cushing, Okla. T. This is part of the Pawnee line extension south. Address Lawrence, Kan., or Ripley, Okla. T.

BEAUMONT, PORT NECHES & PORT ARTHUR (ELECTRIC).—This company filed charter in Texas, March 1, with capital stock of $700,000 and general office at Beaumont. It is proposed to build a system of electric lines between Beaumont, Port Arthur and Port Neches, including suburban roads, which will aggregate about 20 miles. The incorporators are: C. E. Baker, G. A. Noel and others, of Webb City, Mo., and elsewhere. S. M. Scott, of Beaumont, is interested.

BUSH TERMINAL.—This company was incorporated in New York, Feb. 14, with $3,500,000 authorized capital stock, to build new steamship piers, of large size, in South Brooklyn, and to provide a large freight yard and terminal road connecting trunk lines. The property lies between Forty-third and Fifty-first streets, South Brooklyn, and is half a mile deep. Half of this depth is land under water upon which piers more than 1,300 ft. long can be built, which reach out to the edge of the Government channel. These piers will be equipped with electric power and every facility for accommodating steamships of the largest size.

CANADIAN NORTHERN.—It is said that arrangements are now completed to extend this line to Edmondton, N. W. T., through the Yellow Head Pass of the Rocky Mountains in British Columbia, to a Pacific terminus at Bute Inlet. It is said that a cash subsidy of $1,800,000 will be granted by the British Government.

CANADIAN PACIFIC.—In regard to the projected line to extend from a junction with the North Shore Ry., northwest to Shawinigan Falls and thence northeast to Grand Meré, an officer writes that Parliament has merely been asked for a franchise and that the route has not yet been definitely determined upon. (Jan. 31, 1902, p. 85.)

CAPE BRETON.—Grading is completed on 30 miles of the line between Sydney and Louisburg, N. S., and track has been laid on a portion of this. Application is now being made for a bonus for further extension of 100 miles to the Arichat-Mira bridge, with a bridge crossing the Bras d'Or lakes. (Feb. 7, p. 103.)

CENTRAL OF GEORGIA.—It is said that portions of the Chattanooga, Rome & Carrollton Division are to be rebuilt to take out some of the worst curves.

CHICAGO, MILWAUKEE & ST. PAUL.—Surveys are reported on the new line which is to be built from Eureka, S. Dak., to Linton, N. Dak. They are at present suspended, to await better weather.

CIMARRON RIVER & TAOS VALLEY.—Right of way is reported secured for this projected line in New Mexico from the mouth of Red River Canyon to Elizabethtown, a distance of about 10 miles, and it is said that work will begin shortly on this section. (Feb. 21, p. 137.)

CINCINNATI & INDIANA.—This company was incorporated in Ohio, Feb. 28, with a capital stock of $500,000, and proposes to build a railroad from Cincinnati to Cottage Grove, Ind., where a connection will be made with the Cincinnati, Richmond & Muncie. The distance is about 40 miles, air line.

EL DORADO & BASTROP.—This company was chartered in Arkansas, Feb. 19, to build a railroad 45 miles long, approximately from a point on the Arkansas-Louisiana State line in Morehouse Parish, Ashley County, Ark., northwest through Ashley and Union counties to a point near El Dorado on the Iron Mountain. The directors are: Geo. J. Gould, C. G. Warner, Russell Harding and others representing Missouri Pacific interests.

EL PASO & SOUTHWESTERN.—The new line between Deming, N. Mex., and Bisbee, Ariz., was reported opened Feb. 12, the first through trains having been run at that time. The line is about 200 miles long.

EUREKA & EASTERN.—It is officially announced that the various reports and rumors about this projected line in Idaho, California and Oregon are entirely unfounded, and that there is apparently no authority for it.

FORT WORTH & RIO GRANDE.—The preliminary surveys for the proposed extension of this line south from Brownwood, Texas, to San Antonio, have been completed, and the line is said to be located as far as Brady, 50 miles. A line has also been surveyed from Brady to Llano, 50 miles further, in a southeasterly direction, where connection can be made with the Houston & Texas Central. (Construction Supplement, Oct. 11, 1901.)

HONDURAS ROADS.—A company has been organized in Cleveland, Ohio, by Louis Lowner, of Tegucigalpa, Honduras, to build a railroad along the coast from Port Burchard to El Dorado, 40 miles. The estimated cost of the work is $600,000, and it was the plan of the projectors to begin work in February. The new line will open up a fruit country.

HOUSTON & TEXAS CENTRAL.—An officer confirms the report that a corps of engineers is engaged in making surveys between Navasota, Texas, and Madisonville, a distance of about 53 miles. No information as to the prospects of building is available and the surveying now being done is preliminary work only. (Feb. 28, p. 153.)

An officer writes in regard to the extension from Burnet, Texas, to Lampasas, 23 miles, that location survey has been made and right of way purchased, including terminals in Lampasas. The contract for grading and masonry has been let to John P. Hughes, of Fort Worth, and building was to begin March 1. The rock work is heavy and the maximum grades are 1¼ per cent. com-

pensated, with maximum curvature 4 deg. Orders have been placed for four 80-ft. deck truss span bridges, and one bridge 125 ft. through truss span. J. N. Miller is General Manager. (Nov. 8, 1901, p. 782.)

INDIANAPOLIS, SHELBYVILLE & SOUTHEASTERN TRACTION.—This company, which was incorporated September, 1901, has recently made a mortgage to secure an issue of $500,000 5 per cent. bonds to cover the cost of work now in progress between Indianapolis and Shelbyville, Ind., 25 miles. Edward K. Adams is President.

LAKE SHORE & MICHIGAN SOUTHERN.—A special meeting of shareholders has been called for March 20 to authorize a new branch from the main line at Ashtabula, Ohio, to a point south in Trumbull County. The estimated cost of the work is about $400,000.

MALDEN, KENNETT & SOUTHEASTERN.—An officer writes in regard to this proposed line in Missouri, chartered Feb. 11, that work will begin as soon as the weather permits on the line between the points named, 23 miles. The country is flat and sandy and there will be no tunneling and but little trestling. The grade will average about 18 in., and it will not be necessary to cut more than three miles of right of way. R. H. Jones is President, and Virgil McKay, General Manager. The company's office is at Kennett, Mo. (Feb. 21, p. 137.)

METROPOLITAN ELEVATED (CHICAGO).—This company expects to open up an extension of its line on Monday, March 10. The new portion, which extends from Western avenue to West Fortieth street, is about two miles long and has seven stations on it.

MEXICAN NATIONAL.—This company is said to have under consideration early building of a cut-off from San Miguel, Mex., south to El Salto, about 400 miles. Three surveying parties are now in the field locating the route. The present route between San Miguel to the City of Mexico is very roundabout.

MEXICO ROADS.—Mr. J. S. Eldridge, of Dos Cabezas, State of Sonora, Mexico, is interested in the project to build a railroad from the Dos Cabezas mines to Casas Grandes, where connection will be made with the Sierra Madre line, and thence to a connection with the Mexican Central, at or near Ojo Caliente. The total length of the proposed road is 150 miles. A large force of men are at work grading the roadbed out of Dos Cabezas, about 15 miles of grade having been already completed. There is said to be ample capital behind the enterprise, and it is said that the line will be built with all possible speed. It will open up a rich mineral region which is now lacking in transportation facilities.

A survey is now being made for a railroad that is to be built connecting the Zimapan mining camp, in Mexico, with either the Mexican National or the Mexican Interoceanic railroads. The parties interested in this project are J. F. Fairchild, James Gill, Robert Davis and W. Cowan, all of New York City; W. C. O'Brien, of the City of Mexico, and W. R. George, of Zimapan, Mexico.

It is announced that the Development Company of America will build a railroad from Casas Grandes, Mexico, south to a tract of timber land embracing about 500,000 acres which it recently purchased. The road will be about 90 miles long.

MISSOURI, KANSAS & OKLAHOMA.—An officer sends the following information about this company, which is the Oklahoma incorporation of the Missouri, Kansas & Texas. The line runs from Coffeyville, Kan., to Guthrie, Okla. T., with a branch from Wybark, on the Missouri, Kansas & Texas in Indian Territory, to a connection with the first main line at some point in the Osage Nation not yet located. The length of the line between Coffeyville and Guthrie is about 150 miles. The Oklahoma extension is 30 miles long, and the Wybark branch 78 miles. Location is at present in progress by five parties of engineers, and it is expected to close contracts some time during March. Some of the work is quite heavy. The maximum grades are 1 per cent., and maximum curvature 4 deg. The required rails have already been purchased. The cost of the work is to be met partly or wholly by the issue of new securities. L. P. Yale, Wainwright Bldg., St. Louis, is Chief Engineer. (Jan. 10, p. 32.)

MOUNDS & OLIVE BRANCH.—This company has been incorporated in Illinois, with a capital stock of $10,000, in the interest, it is said, of the Illinois Central. It is proposed to build a line from Gale, Ill., through Thebes to Mounds, 20 miles southwest. This line will give the Illinois Central a second loop line down the Mississippi Valley from Carbondale to a short cut connection with the Cotton Belt, for traffic going east and south.

NEW YORK, NEW HAVEN & HARTFORD.—Work is reported well under way on the double tracking of the Naugatuck Division from a point below Derby Junction, Conn., to Waterbury. The contractors are: John J. O'Brien & Co., New York. (Nov. 29, p. 832.)

OSKALOOSA & TAMA (ELECTRIC).—It is said that work will be begun by the first of June on this new electric railroad system in Central Iowa, which is to be about 100 miles long, extending from Buxton through Oskaloosa, Montezuma, Barnes City, Malcom and Tama, with the intention of carrying it on eventually from Tama north to Toledo and beyond. Surveys and investigations were made last spring and the company was organized Nov. 9, 1901, with W. S. Clark, of Oskaloosa, Iowa, President; R. A. Hall and James E. Blake, of Cedar Rapids, have also considerable financial interest in the project. Final surveys are to be made this month.

OXFORD-DICKERSON.—It is reported that contracts have been let for building this spur line six miles long from Oxford, N. C., to a connection with the Seaboard Air Line at Dickerson. The road was graded some years ago, and it is thought that it will now be completed and put in operation by the 15th of April. A. W. Graham, of Oxford, is interested.

PACIFIC & YUKON.—This company was incorporated in New Jersey, Feb. 28, by Henry S. Osborn, of Chicago; R. F. Pettibone, of Evanston, Ill.; and G. H. S. Martin, of Camden, N. J. No definite route is announced.

PENNSYLVANIA.—Each of the branches of the New York Legislature passed, on Feb. 26, a bill to grant charter in perpetuity to this company in order that it may secure terminal facilities on Manhattan and Long Island. There was considerable opposition to the bill by the minority in the Senate.

PENNSYLVANIA ROADS.—In connection with the lease of a large tract of land in Slippery Rock Township, Pa., by Pittsburgh interests which intend to develop limestone, iron ore and coal deposits found there, it is said that a railroad will be built between Slippery Rock and New Castle or Butler, Pa., 15 miles. Wm. Lockhart, of Pittsburgh, is interested.

PERE MARQUETTE.—An officer writes in reference to press reports about work to be done at Toledo, Mich., that no considerable improvements are planned there at present.

PITTSBURGH & SOUTHWESTERN.—This company has been incorporated in Pennsylvania, with a capital stock of $80,000, to build a steam railroad five miles long beginning at a point on the line of the St. Clair Terminal, where it crosses the Monongahela River, in Allegheny County, Pa., and running thence southwest to a point on the line of the Wheeling Division of the Baltimore & Ohio near Cochran's Mills. J. C. Bily, of Allegheny, is President.

RESTIGOUCHE & WESTERN.—Announcement is made by Thomas Malcolm, contractor, that the necessary financial arrangements are completed for building this road, on which work is already begun between Campbellton, N. B., and St. Leonard, N. B. Ten miles of this line were completed in 1899 between Campbellton and Glencoe.

ST. LOUIS, IRON MOUNTAIN & SOUTHERN.—Surveys are reported in Arkansas for a new line between Conway and Cadron, seven miles distant, including a tunnel at the Cadron Gap. The object of the work is to shorten the existing line.

SOUTHERN RY. CO. (ILLINOIS).—The Secretary of State of Illinois has issued a license incorporating this company, which is to build a railroad in Cook County from Lake Calumet. The capital stock is $100,000 and the office of the company Chicago. The incorporators and first board of directors are: Wm. J. Neebes, Jr., Ralph R. Keller and Clarence S. Pigott.

SOUTHERN PACIFIC.—According to newest advices, the projected cut-off of the Union Pacific is to be built across Salt Lake from Ogden, Utah, to Lucin, in spite of an adverse report presented by the Chief Engineer last October, on the ground that the trestle would be endangered by the frequent changes which occur in the level of the lake. The present line between Ogden and Lucin is 146 miles long; the air line across the lake 104 miles. It is thought that the shallow portions of the lake where the line crosses will be filled around the temporary bridge with earth and rock and the trestle from shore to shore will be nearly 50 miles long. Piling has been ordered for this work and bids closed Feb. 10. For illustration of the several routes under consideration, including the one decided upon, see *Railroad Gazette*, Sept. 13, p. 644, and editorial comment, Sept. 27, p. 661.

TEXAS ROADS.—Harry Landa, who owns extensive flour mill properties at New Braumfels, Tex., is said to be interested in the project to build a railroad from New Braumfels to a connection with the Southern Pacific at Marion, 30 miles distant. If the Southern Pacific cannot be induced to build the line a private company is to be organized for the purpose.

TEXAS SHORT LINE.—Announcement is made by officers of this company that the road is to be extended northeast to Pittsburgh, Tex., by way of Quintana, Wood County, and also southwest to Corsicana, Tex., by way of Canton and Maybank. It is now building between Grand Saline and Hoyt, Tex., and about 10 miles of track has been laid. The distance from Hoyt to Pittsburgh is 42 miles and the extension to Corsicana would be about 58 miles long. (Feb. 7, p. 104.)

TEXAS SOUTHERN.—Application has been made to the State Railroad Commission for authority to issue bonds to the amount of $1,296,000 on 72 miles of completed and proposed line between Marshall, Texas, and Winnsboro. The purpose of the issue is to provide funds for an extension south from Marshall to Beaumont and Sabine Pass, a distance of about 200 miles. It is also proposed to build north 65 miles from Winnsboro to the Red River by way of Paris. The Missouri, Kansas & Texas, which is interested in the above road, has planned an extension to the Red River from Atoka, Ind. T., where a connection will be made. (Feb. 14, p. 122.)

TORONTO-OAKVILLE (ELECTRIC).—Surveys for a new electric line between Toronto and Oakville are being made by S. H. Sykes. It is thought that the line will be a continuation of the Toronto Suburban Road, and that Oakville will connect with the Hamilton Radial. Work is to begin on both these lines early in the spring, giving a through route on private right of way between Toronto and Hamilton, Ont., paralleling the Grand Trunk. The distance from Toronto to Oakville is 21 miles on the line of the Grand Trunk, and from Oakville to Hamilton, 38.

TRANS-ALASKAN.—An officer writes in regard to this proposed line from Cook's Inlet to Behring Strait, that a location survey of a portion of the route is now being made, and that it is proposed to ask for bids soon for the first 100 miles of the line. J. J. Frey, of Seattle, Wash., is President, and W. E. Smith, of Seattle, is Chief Engineer. No contracts have been let. The length of the line, as originally projected, is 849 miles. (Construction Supplement, Oct. 11, 1901.)

TRINITY, CORRIGAN & NORTHWESTERN.—Charter for this company was filed at Austin, Tex., on March 1. The general office is at Carmona, Tex. It is proposed to build a railroad 34 miles long from Trinity through the counties of Trinity and Polk to Corrigan, Polk County. The directors are: F. B. Cameron, W. W. Cameron, J. W. McWilliams and others of Waco, Tex., and elsewhere.

UNION PACIFIC.—Contract has been let to Mahoney Bros. for a cut-off in the vicinity of Lookout, Wyo. The cut-off will be 3.04 miles long and while it will reduce the distance only a fraction of a mile, it will do away with a number of sharp curves and heavy grades.

VELASCO, BRAZOS & NORTHERN.—Announcement is made that interested parties have taken the preliminary steps for an extension of the line north from Anchor, Tex., through Hempstead, with Forth Worth as the ultimate northern terminus. The road now is in operation between Velasco and Anchor, 22 miles. Surveys were reported last month between Anchor and Sugarland, 20 miles, which is on the line of this proposed extension. The distance from the present line to Hempstead is about 82 miles northwest. (Feb. 21, 1902, p. 138.)

VIRGINIA ROADS.—It is said that a new railroad between New Castle and Roanoke, Va., a distance of 25 miles, is to be built by owners of mining properties in Craig and Roanoke counties.

WARREN & WICHITA VALLEY.—The State Board of Railway Incorporators, Arkansas, granted, in January, a charter for an extension of this company's line 23 miles, from a point on its present line south to the town of Moro Bay, Bradley County. The capital stock is increased $70,000.

WASHINGTON ROADS.—Reports from Washington show that 157 miles of new railroad were built in 1901, and that there are at present 230 miles building already under contract. During the past year work has been done by 11 companies. The Northern Pacific leads with 88 miles building and completed during the year. The Great Northern during 1901 built 12 miles, and the Oregon R. R. & Navigation Co., 89, part of which, however, was outside the State. The Northern Pacific has at present 33 miles building on the Green River Extension and what is known as the Peninsular Branch. The Great Northern is at work on the Chuckanut cut-off, 30 miles long. The Portland, Yakima & Vancouver is building 15 miles of extension; the Bellingham Bay & Eastern, two miles between Fairhaven & Whatcom; the Republic & Grand Forks, 40 miles between the points named; the Washington & Great Northern, 76 miles from Marens to Republic, and the Seattle & Tacoma Interurban, 35 miles between Seattle and Tacoma.

WEST VIRGINIA CENTRAL & PITTSBURGH.—An officer denies the current press report that a branch road is to be built from a point near Fairmount to Arnettsville, W. Va.

GENERAL RAILROAD NEWS.

CALDWELL & NORTHERN.—Papers were filed with the Register of Deeds in North Carolina, Feb. 16, by which the entire property of the Caldwell Land & Lumber Co. changes hands. This includes the Caldwell & Northern R. R., which runs 11 miles northwest from Lenoir to Collettsville, and it is said that it will be extended at once from its present terminus to a tract of timber recently purchased. Geo. Shakespeare is trustee. (Construction Supplement, Oct. 11, 1901.)

KANSAS CITY, MEMPHIS & BIRMINGHAM.—It is said that arrangements have been made with the Kansas City, Fort Scott & Memphis to pay interest on the income bonds, beginning March 1, at the rate of 5 per cent. per annum, in consideration of a 10-years' option to purchase assenting income bonds beginning Sept. 1, 1902. The price is 95 per cent., plus accrued interest. Holders of income bonds desiring to accept these terms are requested to deposit with the Old Colony Trust Co., of Boston, before April 1.

LAKE TAHOE RAILWAY & TRANSPORTATION.—This company has recently made a mortgage to the Mercantile Trust Co., of San Francisco, trustee, to secure $500,000 of 30-year 5 per cent. first mortgage gold bonds, due Oct. 1, 1931; $275,000 of these are outstanding and the balance is to be issued only for permanent improvements and additions to the property. The mortgage is a first lien on the company's entire property, including marine railways, wharves, steamers and 16 miles of railroad.

LITTLE FALLS & DOLGEVILLE.—An order has been granted the Metropolitan Trust Co. of New York by Justice Scripture to sell this railroad property. The company holds $250,000 first mortgage bonds. The Little Falls & Dolgeville is a standard gage road 10 miles long between the points named. It was placed in the hands of a receiver on May 31, 1899. It is said that it is likely to be bought in the interest of the New York Central & Hudson River and extended to the Pisco Lake region.

METROPOLITAN STREET (NEW YORK.)—Notice to the stockholders of the Metropolitan St. Ry. Co. is given by I. & S. Wormser, who ask for proxies to oppose the new reorganization to be voted on at the meeting, March 20, on the ground that it is opposed to the interests of the stockholders in confining the dividends to be paid in the future to 7 per cent.

PACIFIC ELECTRIC.—This company gives notice under date of Feb. 25, that it has acquired the railroads and property of the Los Angeles & Pasadena Electric, the Pasadena & Mt. Lowe and the Pacific Electric of Arizona companies, and that all of the above mentioned roads will be operated hereafter under the control and as part of the system of the Pacific Electric Co. H. E. Huntington is President, Epes. Randolph Vice-President and General Manager, W. H. Smith Manager, and G. E. Pillsbury Chief Engineer.

PHILADELPHIA & READING.—Gross receipts from the railroad company from July 1, 1901, to Feb. 1, 1902, were $17,902,113, as against $16,467,417 the previous year. After deducting expenses, including renewals, etc., net earnings were $6,887,147, as against $5,659,766. The Coal & Iron Co. also show an increase, the figures to date being $17,963,299, as against $16,748,751. Net earnings were $6,887,147, as against $5,659,766. The Reading Co. also showed net income of $609,937, as against $157,490. The combined net earnings of all the companies were thus $9,142,099 for the seven months ending Feb. 1, as against $7,148,656 last year. After all deductions, including taxes, proportion of annual fixed charges, etc., the estimated surplus is $3,108,099, as against $1,611,799.

ST. LOUIS & SAN FRANCISCO.—This company has taken over the Oklahoma City & Western, which is building between Oklahoma City and Quanah, Tex., 175 miles. The Blackwell, Enid & Southwestern, now completed for 87 miles between Blackwell, Okla. T., and the Choctaw Northern crossing, and from Vernon, Tex., 13 miles north to the Red River, is building between the Choctaw & Northern crossing and the Red River, 154 miles.

SAVANNAH, FLORIDA & WESTERN.—At a meeting of the stockholders on Feb. 26, the consolidated mortgage to secure $31,000,000 4 per cent. bonds, in regard to which notice was previously given, was authorized. This mortgage is to refund the outstanding bonds, which aggregate about $26,000 000, and will also provide for extensions and betterments.

STATEN ISLAND ELECTRIC.—This company, together with the New York & Staten Island Electric and the New Jersey & Staten Island Ferry Co., was placed in the hands of John Greenough, receiver, on Feb. 28, by order of the Supreme Court of New York. It is said that this is the result of a friendly suit and a preliminary step toward reorganization.

UNION PACIFIC.—Gross receipts for the seven months ending Jan. 31, 1902, were $29,387,294, an increase of $2,642,236 over last year's figure on 62.5 more miles of line. After deducting expenses, including taxes, there remained a surplus of $14,444,203, as against $12,031,280 last year. The average miles operated, including the Union Pacific, Oregon Short Line and Oregon R. R. & Navigation companies, were 5,741 for the seven months ending Jan. 31, 1902, and 5,678 for the year previous. The expense account includes the operation of water lines.

WESTERN MARYLAND.—The Baltimore City Council passed an ordinance, March 3, to advertise for bids for the sale of Baltimore's interest in this property. It is thought that bids will be advertised for at once. Under the ordinance passed the bidders must name the railroad interests they represent.